STUDY OF FINGERPRINT CLASSIFICATION AND THEIR GENDER DISTRIBUTION AMONG POPULATION OF MADURAI AND NEIGHBOURING DISTRICTS

Dissertation Submitted for

MD Degree (Branch XIV) Forensic Medicine
April 2012

The Tamilnadu Dr.M.G.R.Medical University
Chennai – 600 032.
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CERTIFICATE

This is to certify that this dissertation titled "**STUDY OF FINGERPRINT CLASSIFICATION AND THEIR GENDER DISTRIBUTION AMONG POPULATION OF MADURAI AND NEIGHBOURING DISTRICTS"** submitted by **DR.R.CHANDRASEKAR** to the faculty of Forensic Medicine, The Tamilnadu Dr. M.G.R. Medical University, Chennai in partial fulfillment of the MD degree branch XIV Forensic Medicine, is a bonafide research work carried out by him under our direct supervision and guidance.

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DECLARATION

I**, DR.R.CHANDRASEKAR,** solemnly declare that the dissertation titled "**STUDY OF FINGERPRINT CLASSIFICATION AND THEIR GENDER DISTRIBUTION AMONG POPULATION OF MADURAI AND NEIGHBOURING DISTRICTS"** has been prepared by me. This is submitted to **The Tamilnadu Dr. M.G.R. Medical University, Chennai,** in partial fulfillment of the regulations for the award of MD degree (branch XIV), Forensic Medicine.

Place: Madurai **DR.R.CHANDRASEKAR**

Date:

ACKNOWLEDGEMENT

The credit for perception and realization of this work goes to my teacher and guide, Professor **Dr. G. NATARAJAN, M.D.,** Professor and Head of the Department, Department of Forensic Medicine, Madurai Medical College, Madurai. It is my privilege to acknowledge my heartfelt thanks to him.

At the very outset, I would like to thank **Dr.A.EDWIN JOE. M.D.,(FM)** the Dean Madurai Medical College and **Dr.SAMINATHAN M.S.,** Medical Superintendent**,** Government Rajaji Hospital, Madurai for permitting me to carryout this study in this Hospital.

I thank **Dr. T. SELVARAJ**, D.C.H., M.D., Assistant Professor, Department of Forensic medicine, Madurai Medical College, Madurai, for his timely help and proper guidance.

I am most indebted and have great pleasure in expressing my deep sense of gratitude to **Dr. SivaramaSubramanian, Dr. M.Alavudin, Dr. P. Raghava Ganesan, Dr.Saravanan**, Tutors of the Department of Forensic Medicine, Madurai Medical College, Madurai for their easy accessibility and timely suggestions, enabled me to bring out this dissertation.

CONTENTS

TITLE : STUDY OF FINGERPRINT CLASSIFICATION AND THEIR GENDER DISTRIBUTION AMONG POPULATION OF MADURAI AND NEIGHBOURING DISTRICT

AIM OF THE STUDY :

To study the fingerprint classification and to study the ridge count in fingerprints of males and females

MATERIALS AND METHODS :

250 Males and 250 Females subjects were studied in the out patient Department of Govt. Rajaji Hospital, Madurai during the period of 1st January to 31st October 2011. Glass slab inking roller method was used to obtain fingerprint.

RESULTS AND ANALYSIS:

The predominant pattern among both male and female is Ulnar loop (48.30%) in Male and (54.10%) in Female respectively . Followed by Plain Whorl (30.00%) in Male and (26.50%) in Female respectively. Least noted pattern among both Male (0.60%) and Female (0.40%) is Exceptional Arch.

The present study revealed the ridge count of ulnar loop is highest and radial loop is least. Mean ridge count in Male is 12.4 and in Female is 12. The ridge count in male is slightly more than in females.

CONCLUSION:

Fingerprints are unique for positive identification with no sexual dimorphism.

The most frequent pattern being ulnar loop in both sex with mean ridge count slightly more in males.

INTRODUCTION

"Knowledge is power", because intelligence without a proficient knowledge will not serve any purpose. Thus, before starting to analyse any event, person or an object , since a thorough knowledge of the material or man is pivotal. An investigation always starts with the identification of the core material or person involved. In Forensic Medicine or Forensic Science, Identification is a key factor to open up the door of mysteries or otherwise secrets! As stated in Criminology Theories a subject who indulges in any criminal activity, whatever smartness he bears, knowingly or unknowingly leave vital clues in the corpse (Body Of Evidence), or in the place where the incidence occurs .So, time and again we apply various techniques to collect the pieces of information or imprints he left and with our background knowledge, try to make a full picture of the incidence and invariables identify the criminal behind the scene.

The mere word "Identification" implies various meanings at various situations or its meaning varies with tasks involved. In Forensic Medicine identification stands for **"Determination of individuality of a person"**.

Identification can be divided, into 1.C**omplete (absolute) or 2.Incomplete (partial) Identification.** Complete identification means the

absolute fixation of individuality based on unique features like Name, age, sex, address etc. This is achieved by the efforts of Police, Doctors, Relatives and Friends. Partial identification implies ascertainment of only one or few aspects of a person. In cases of grossly mutilated, advanced decomposed body, etc., where only one or few facts of person's age or sex or race or nationality etc are established while other facts still remain unknown. The most successful approach utilizes a combination of more than one method to get a complete picture of a person.[2]

The following characters are usually noted for the purpose of identification, like **race, sex, age, complexion and features, hair, fingerprints, footprints, lip prints, teeth marks, deformities, tattoo marks, scars, occupational marks, handwriting, clothes, personal articles, speech or voice, gait, brain mapping (Brain imprint) and DNA profile / DNA finger print etc.,**

Out of these plethora of methods, fingerprint system is the best, which stood **stands the test of the time**, and it has been estimated that **the probability of two persons having identical finger impressions is about one in sixty four thousand million population of the world**. Surprisingly, even the fingerprints of identical twins are not similar.[1]

Personal identification through fingerprints has been recognized since long time and is regarded as the greatest contribution to the law enforcement. Through its unique characteristics, the science of fingerprint provides a special service in the admission of justice and also in other areas where positive identification is of paramount importance.[3]

Study of fingerprints is known as **Dactylography or Dactyloscopy**, and at present it is also known as **Henry-Galton system of identification**, to emphasize the scientist who invented finger prints as a method of identification, way back in Dactylography is the process of taking the impressions of **papillary ridges** of the fingertips for the purpose of identification of a person. Identification by this method is absolute, without any chance of error, provided there is no fallacy in the procedure.[4]

The common uses of fingerprints for the purpose of identification are:

1. Criminals whose fingerprints are found at the scene of crime and of fugitives through fingerprint comparison

2. In identifying the unknown, deceased, missing persons, those who are suffering from amnesia [Fugue status] and roaming about

3. In establishing the correct identity in cases of kidnapping, and in detection of bank forgeries.

4. Nowadays, fingerprint identification is being applied to prevent either accidental or purposeful exchange of newborn infants in hospitals. (However, DNA fingerprinting is the absolute and specific method for solving baby replacement or paternal disputes).

With the rise in the number of criminal cases like robbery, rape and assault, fingerprint is increasingly becoming an indispensable tool in the hands of investigating officers to nail down the culprits. Already a number of studies have been done on fingerprints; Apart from the usual tasks associated with fingerprints as mentioned above, fingerprint ridge count could be utilized to determine the gender of the otherwise mutilated body or the gender of the fugitive involved in the crime! I put forth this endeavor to study the papillary ridges in sex determination in the Madurai region, thus it enable a future colleague or a scientific personnel to make utilize this reference, and it meanwhile enables us to create a database for the region concerned.

2.REVIEW OF LITERATURE

2.1 History

Scientists have used fingerprints for personnel identification, and efforts had been putforth to treat fingerprint science as separate branch, and christened the treatise (discourse) of fingerprints as "DACTYLOGRAPHY". Modern fingerprint matching techniques were initiated as early as the late 16th century.[6]

Henry Fauld, in **1880** first scientifically studied the individuality and uniqueness of fingerprints. In the late 19th century, **Sir Francis Galton** conducted an extensive studies on fingerprints.

The discovery of uniqueness of fingerprints caused an immediate decline in the prevalent use of anthropometric methods of identification and led to the adoption of fingerprints as a more efficient method of identification, because of it's specificity and fool proofness.[7]

In the early 20th century, fingerprint identification was formally accepted as a valid personal identification method by the law enforcement agencies across the world and became a standard procedure in Forensic Medicine / Science.

Purkinje, for the first time distinguished '9' principal configurations of **rugae** and **sulci** present on the terminal phalanges of human hands. [9] **Faulds** mentioned that the pattern of these papillary ridges remain unchanged in an individual, throughout his life.[10]

Herschel used fingerprints for personnel identification during the pre independent era in **India**.[11]

2.2 Classification

Galton classified the type of fingerprints depending upon their primary pattern as follows,

1.Loops,

2. Whorls and

3.Arches.[12]

Forest reported that**, dermatoglyphics** are laid down **early in embryogenesis** and represent a part of **structural constitution.** [13] **Bloterogel** expressed a correlation between physical characters and blood groups. [14]

2.3 Embryology of Dermal Ridges [15]

Development of epidermal ridges is first seen in the form of localized cell proliferations in the basal layer of the epidermis around 10th

to 11th week of human prenatal development. These cell proliferations form epidermal ridges that project into the dermis. The number of primary ridges, as they are termed, continues to increase by the formation of new ridges between existing ridges or from existing ridges on the periphery of the pattern. This increase in the number of primary ridges accompanies a general increase in the size of the digit and continues until approximately the seventeenth week.

At this time ridges become discernible on the volar surface as fingerprints. However, ridge patterns are recognizable with the initial formation of epidermal ridges in the basal layer of the epidermis as early as the fetus with only 60mm of crown-rump length.

During the period of ridge formation, ridge patterns become more elaborate, increasing the number of ridges that comprise the pattern. During this period also, the fetus is susceptible to developmental changes from various environmental factors as well as important genetic actions, e.g. cell differentiation and control of growth rates.

2.4 Anatomy of fingerprints:

The skin of hands consists of two distinct layers – **Epidermis and Dermis**. Each one is derived from different embryonic layers. Epidermis is

derived from ectoderm and dermis from **mesenchyme** of the **(mesoderm)** embryonic layer. Each layer has got different functions to perform.

2.4.1 Few facts about Epidermis:

1. Acts as a selective barrier, facilitating or preventing the passage of materials across the surface, which it covers.
2. It also protects underlying tissue against dehydration, chemical and mechanical damage.
3. May secrete or elaborate into the spaces which it binds.
4. It functions as a sensory surface.
5. It generates the appendages of the skin.
6. Has got regeneration capacity.
7. Nutrition is by diffusion from dermis.

2.4.2 Few facts about Dermis:

1. It provides mechanical strength due to its collagen and elastic fibres.
2. Vascular supply is limited to dermis.

2.5 Interspace and its histology:

The interspaces between epidemis and dermis shows complex topography being marked by R**idge and Groove inderdigitation**, like peg and socket, between the two, so they are firmly holding each

other. The dermis is usually thicker in dorsal skin areas. But in case of palm and sole the epidermis is thicker than the dermis of other regions and structurally differs from the thin epidermis present elsewhere.

Each epidermal ridge of palm and sole has an underlying ridge of connective tissue called as **primary dermal ridge**. Each primary ridge is divided into **secondary dermal ridges** by downward projection of epidermis called **rete pegs,** which appear like pegs in section.

2.6 Microscopy:

2.6.1 Epidermis : The epidermis of the skin of finger bulbs shows several distinct layers of cells arranged in two zones.

Innermost - Zona germinativa (Germinative zone).

Superficial - Zona cornea (Keratinising zone).

Zone germinativa : Consists of two layers from deeper to superficial.

1. Stratum germinativa consists of single layer of columnar cells i.e., Stratum basale, or malpighian layer. The cells are placed perpendicular to the basement membrane.
2. Stratum spinosum (prickle cell layer) : Is a more superficial layer of variable thickness composed of polyhedral cells. The more superficial zone of zona cornea consists of three layers of cells.

Stratum granulosum : As the cells are pushed upwards from the stratum spinosum, they flatten and synthesise ‘keratohyaline’ granules.

Stratum lucidum : As the cells of stratum granulosum move outwards, these cells lose their nuclei and keratohyaline granules fuse and mingle with the tonofibrils. This constitutes the clear or transparent layer stratum lucidum.

Stratum corneum : In this layer i.e. outer most layer of skin, the cells are compressed into opaque squames, which are full of horny keratin.

2.6.2Dermis (corium):

Dermis varies in thickness according to site, being thickest in palm and sole. Dermis is quite tough, flexible and elastic due to the presence of collagen and elastic fibres.

Microscopy:

It consist of collagen connective tissue fibres with ranging number of elastic fibres, blood vessels, lymphatics, nerves and sweat glands. Dermis has got two layers:

1. Reticular layer (deeper).
2. Papillary layer (superficial).

Reticular layer:

This layer mainly consist of bands of collagen fibrous tissue and also some elastic tissue fibres. These collagen fibres are arranged in parallel. The arrangements of these fibres vary in different parts of the body called as cleavage lines of skin (cleavage lines of Langer).

Papillary layer:

This layer mainly consists of projecting papillae, which are made up of numerous vascular and sensitive eminences. These papillae are projecting perpendicularly, which are further divided into two or three secondary papillae and are received into corresponding pits under the surface of the epidermis, where the sensitivity of the skin is required more.

In the palm and sole, the papillae are arranged in rows. So each ridge contains two rows of papillae and between these rows the ducts of sweat glands passes outwards to open on the summit of the ridge. Since the opening of the duct of the sweat gland is one at the summit of ridge, study of fingerprints is nothing but the study of patterns of ridges; it is quite useful in the branch described by Edward Locard as ‘Poroscopy’. Poroscopy is the study of sweat pores on these ridges.

In the past, several scientists have worked on fingerprints and the main objective was to find a method of absolute identity of an individual.

In History, thousands of years Before the birth of Christ, fingerprints were being used on pottery to mark its marker and brand on the cliff of Nova Scotia. Papillary ridges like carvings of prehistoric age have been discovered.[4]

The science of fingerprints was known in ancient Assyria, and was used for the purpose of identification in 700 A.D. [16]

Since 700 A.D, this science of fingerprint has been used for the purpose of identification. Chinese used fingerprints as official documents in 3000 BC. [17]

The first to proposed the theory that the arrangement of friction ridges is never duplicated in two individuals was J.C.A Mayer of Germany, in a study published in 1788. [5]

In 1858 Sir William J. Herschel, introduced the fingerprint system in **Bengal,** India, as a means of identification and as a means **for prevention of impersonation** as it is called.[11]

Before fingerprint method came in practical to detect the criminals, there was a method in practice called **Anthropometry**. This system also known as **Bertillon system of criminal identification** was named after **Alphonse Bertillon** of Paris who had invented it in 1880. [19]

Dr. Henry Fauld (1880) of Tokyo, published an article mentioning that the ridge patterns are extremely divergent in different individuals and remains unchanged throughout life and that the fingerprint can help in identification. [10]

Significant contributions were made by two **Bengali Police officers by name Khan Bahadur Azizul Haque (2002) and Rai Bahadur Hem Chandra Bose,** in the classification system, which came to be known as **Henry's ten digit classification** systems. Azizul Haque contributed to the perfection of **ten digit pigeonhole method**, where as Hem Chandra Bose evolved a system of sub-classification, and a method of **single-digit classification**. [5]

Herman Welcker (1898) professor of Anthopology at the University of Halle, Germany was the first to publish the palm print of his right hand, taken in 1856 and in 1897, a time interval of 41 years between the two prints, which was a record until Herschel published the prints of his fingers showing a time interval of 51 years. [21]

2.7 First insight into gender difference in fingerprints

In 1961 **Cummins and Midlo,** found that females generally have smaller bodies than males. It might be expected that their **ridges would be**

narrower than males. They found that the **number of ridges per centimeter in males is less compared to females.** [22]

2.7.1 Ridge count and gender difference

Jantz RL, (1975) studied sex and race differences in finger ridge and gender difference count correlations. Ten fingers were compared by race and sex in 11 samples representing Negroes and Caucasians: five from sub-saharan Africa, one American Black, three European, one American white and one from India. The samples of European ancestry showed no consistent sex difference in mean correlation, although female American whites significantly exceeded males. In three of six Negro samples and in the parsis of Indian males showed significantly higher average correlations than females. The pattern of sex and race differences suggests that the **sex chromosomes, particularly the Y chromosome, play a role in dermal ridge development.** [23]

2.7.2 The first Indian study on gender differences:

Gangadhar. M.R, Rajashekara Reddy. K (1983) has studied finger dermatoglyphics of **male and female Adikarnatakas**, a scheduled caste population of Mysore city of Karnataka state. The analysis includes both qualitative and quantitative characters of basic finger print pattern

type, **loops (57.11%) were common followed by whorls (27.89%) and arches (15.00%)** in the general population with significant sex difference and insignificant bilateral difference.[9]

2.7.3 In 1998, **Mark A. Acree of Federal Bureau of Investigation,**

studied a meaningful study of 400 subjects of African American and Caucasian American of both male and female sex. He found that there is a significant difference in the fingerprint ridge density of male and female. His study showed that female has more number of ridges than male. He also suggested that further studies should be done in other races. [24]

2.7.4 Igbigbi P.S and Msamati (1999) measured **total finger print ridge count (TFRC), atd angle, a-b ridge counts, pattern intensity index (PII) and determined variability of ridge patterns in Malawian subjects.** They found th**at arches were the most predominant pattern in both sexes, followed by radial loops on males and whorls in females. Females have significantly higher TFRC and atd angle than males**, while **males showed higher PII values and higher a-b ridge counts than females**. [25]

2.7.5 Floris G., (2001) studied sex and side differences and the correlations between four quantitative characteristics of palmar dermatoglyphics in a sample population of 809 individuals (418 males and

391 females) from Sardinian population**. Males have greater number of ridges than females, shown by a greater a-b ridge count and a-d ridge count, and a more transverse slope of the main lines, shown by a greater main line index and papillary number.** [26]

The left palm shows a greater number of ridge than the right palm between A line and the triradius d and between the triradii a and b, with a lower main line index and papillary number. The a-b ridge count has a negative correlation with the main line index and with the papillary number and the positive one with the a-d ridge count; these correlations are greater in the left palms, especially in the males. [26]

2.7.5 Igbigbi P.S., Msamati B.C (2002) conducted another study on dermatoglyphics on indigenous black Zimbabweans, they found that ulnar loops were the most predominant digital pattern type in both sexes, followed by whorls in males and arches in females. [27]

2.7.6 Kralik M., Novothy V (2003) investigated epidermal ridge breadth of human fingerprints on ceramic artifacts from contemporary ceramic workshops and has shown that mean **epidermal ridge breadth (MRB**) as observed on ceramics **can be used as an indicator of age (from birth**

maturity) and the **sex of the artifact maker in adulthood.** In their study they suggested a new method of scanning, measuring and data processing.

2.7.7 The **best age estimation method (using equation proposed by Kamp et al** from Grinnell College, USA, and **modified after shrinkage by (7.5%),** median absolute error of estimates was 1.71 years and only in 3.6% of cases the absolute errors were higher than 5 years. Therefore, in a particular ethnic group epidermal ridge breadth of fingerprints on ceramics is suitable for comparing individual's ages. [28]

2.7.8 Purkait R (2003) in his comparative study on frequency of fingerprint patterns and variation in the ten digit classification on males (454 samples – 227 from each tribe) of Mundas and Lodhas, a tribal group of Midnapur district in West Bengal where Mundas exhibit higher frequency of whorl and loop patterns while loops are more frequent among Lodhas.

2.7.9 In the past many studies have been conducted on the fingerprint ridges with the idea of proving a gender difference in the fingerprint, but failed in the methodology. **According to Reddy (1975) the mean ridge count for males is 13.41 and that of female is 12.04.**[30]

2.7.10 A similar study was done on males and females of American Negroes and Caucasian American by Plato et al (1975). He found the **mean ridge density in male is more than female.**[31]

2.7.11 Moore (1994) also carried out a study on ridge to ridge distance and found that mean distance is more in male compared to female.[32]

2.7.12 Okajima (1970) also found that **form index is higher in females than in male in fingerprints.** [33]

Dr. Sudesh Gungadin (2007) showed that a mean ridge count of 13 ridges is more likely to be males and that of 14 ridges is likely to be females. [34]

Ahmed Badawi et al. (2006) showed that male-female can be correctly classified upto 88.5% based on white lines count, RTVTR and ridge count using Neural Network as classifier. [35]

Vinod C.Nayak (2010) reported that study done on 200 subjects (100 males and 100 females) of Chinese origin and 100 subjects (50 males and 50 females) of Malaysian origin revealed that significant gender differences occur in the mean finger ridge count of 12 ridges more likely to be of males and more than 13 ridges is more likely to be of female origin in

Chinese subjects. In Malaysian male 11 ridges or less and in female more than 13 ridges is observed.[37]

A study Richard L.Jantz (1975) showed population variation in ridge count asymmetry and diversity from finger to finger. Asymmetry in particular has generally been attributed to environmental effects operating during the formation of dermal ridges. Patterning along population lines suggests a genetic rather than environmental basis for such variation. [38]

Arabind basu (1976) reported the pattern types exhibiting significant variations between lingayat and vokkaliga and between Adikarnataka and vokkalinga though in general, distributional trend of the three principal pattern types are of the same order in all the three castes, having high frequency of loops, moderate whorls and low arches. In pattern types, differences between sexes are highly significant. [39]

The Fundamental Principles of Fingerprints. 41, 42

1. A fingerprint is an individual characteristic no two fingers have yet been found to possess identical ridge characteristic.
2. A fingerprint will remain unchanged during an individual's lifetime.
3. Fingerprint have general ridge pattern that permit them to be systematically classified.

4. No two fingerprints can be identical. This is true even for uniovular twins. So matching of two fingerprints makes fixation of identity infalliable.
5. Millions of fingerprints can be stored in such a systematic way that, whenever necessary, the desired print can easily be searched out for study.
6. Fingerprints can be taken from even highly decomposed dead bodies, either from the peeled off epidermis of the fingers or from the dermis when the epidermis is lost.
7. Fingerprints can be taken even from mummified dead bodies by dipping the dissected out fingertips in weak alkaline solution, when the fingertips along with the ridges get their normal shape and sizes or by injecting glycerine into the fingertips.
8. Studying the migration of the chloride ions from the fingerprints can give a rough idea about the age of a fingerprint (chloride is present in sebaceous secretions, which gradually vanishes from the fingerprint)
9. To apprehend international criminals, details of fingerprints can be sent from one country to another by telecommunication system.

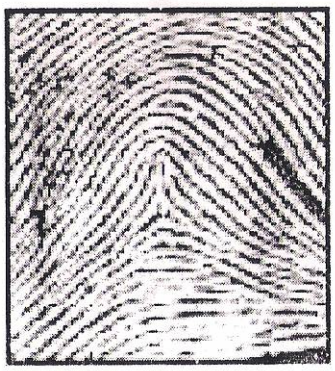
2.8 Finger prints an overview:

Dr. Jan.E.Purkinje, Professor of Physiology in the University of Breslau, in 1823 has **classified all fingerprints into nine types.**[42]

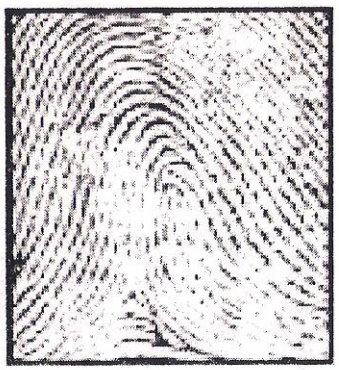
1. **The transverse curves.**
2. **The central longitudinal stria.**
3. **The oblique stripe.**
4. **The almond whorl.**
5. **The spiral whorl.**
6. **The Ellipse.**
7. **The Concentric**
8. **The circle.**
9. **The double whorl.**

Different Types of Fingerprint Patterns

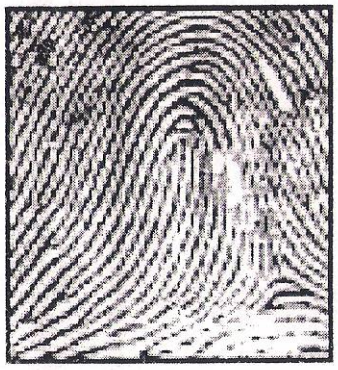
Plain Arch



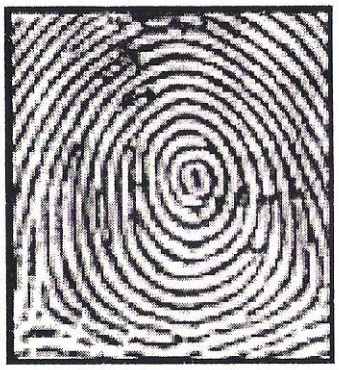
Tented Arch



Ulnar Loop

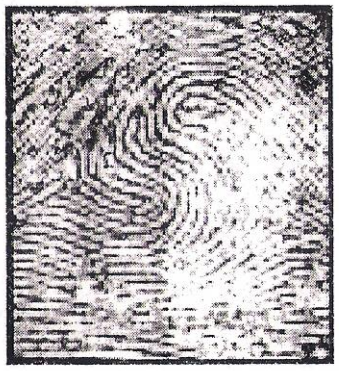


Radial Loop

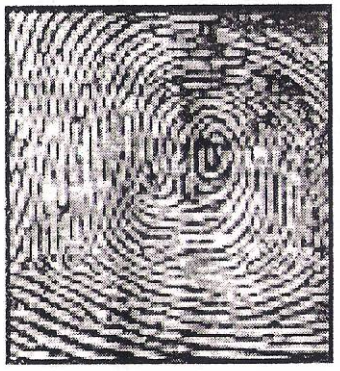


Plain Whorl

Central Pocket Loop



Double Loop Whorl



Accidental Whorl

2.8.1 Sir Francis Galton sorted out nine patterns classified by Dr. Jan. E.Purkinje into **three classes**, namely.[8]

- **Arch**
- **Loop**
- **Whorl**

2.8.2 Sir Edward Richard Henry modified Galton's – Arch, loop, whorl system and classified them into **four main groups** according to the percentage of their distribution in the whole population of the world, these are

- **Loop (65 – 67%)**
- **Whorl (25%)**
- **Arch (6-7%) and**
- **Composite or accidental or chance (3-4%)**

This method is known as **"Henry Galton method" or "Henry method**" is name derived from its originators Sir Francis Galton and Sir Edward Richard Henry. This Henry system of classification is the most efficient and is in almost universal use.

2.8.3 Four main patterns are – Loop, Whorl, Arch and Composite. [3]

1. **Loop:** In terms of fingerprints, as well as in the general application of the word **loop, ridges** along with the other prerequisites. A pattern must possess several requisites before it may be properly classified as a loop. However, this type of pattern is the most common and constitutes about sixty to sixty five percent of all prints.

2.8.2 A **loop** is that type of fingerprint pattern in which one or more ridges enter on either side of the impression, recurve, touch or pass an imaginary line drawn from the delta to core and terminates or tends to terminate on or towards the same side of the impression from where ridge or ridges enter. A loop has one and only one delta. Loops are subdivided into two main types radial loop and ulnar loop according to their positioning and the flow of the ridges.

a) Radial loop is so called because the ridges flow or terminate in the direction of radius bone of the forearm. In case of the right hand fingers, the ridges slant towards left and in the left hand fingers, the slant is towards right side.

b) Ulnar loop is so called because the ridges flow or terminate in the direction of ulnar bone of the forearm, in case of the right hand

fingers, the ridges slant towards right side and for the left hand fingers, and the slant of the ridges is towards left side.

2.8.3 Whorl: A whorl is characterized by a circular pattern having one or more ridges revolve around the core making a complete circle. The whorl is that type of pattern in which at least two deltas are present with a recurve in front of each Whorl type patterns occur in about thirty percent of all fingerprints. It is important to note that this is a very general definition. This pattern however may be subdivided for extension purpose in large groups where whorls are predominant. Even though this extension may be used, all types of whorls are grouped under the general name of whorl and are designed by letter “W”. The subdivision of whorl pattern is as follows:

- Plain whorl.
- Central pocket loop.
- Double loop – lateral pocket loop and twinned loop.
- Accidentals.

a) **Plain Whorl:** Consists of the simplest form of whorl construction and is the most common of the whorl subdivisions. It is designated by the symbol “W” for both general classification and extension

purposes; it has two deltas and at least one ridge making a complete circuit, which may be spiral, oval, circular or any variant of a circle.

b) **Central Pocket Loop:** Is a composite pattern in which most of the ridges take the form of a loop. However, one more ridges recurve around the core to form a central pocket. The circuit may be spiral, oval, circular or any variant of a circle. The central pocket loops has two deltas present and fall within the whorl group for the purpose of classification.

c) **Double Loop:** Are composite patterns and consists of two separate and distinct set of shoulders and two deltas. The two loops may be connected to each other by an appending ridge provided that it does not abut at right angles between the shoulders of the formation. It is not essential that both sides of the loop be of equal length, not that two loops be of the same size. The double loops are of two types- Lateral pocket loop and twinned loop. The distinction between twinned loop and lateral loop was made by Henry.

d) **Lateral pocket loop :** In this pattern one loop serves as side pocket to the other loop. This pocket is formed by the downward bending on one side of the ridges of the other loop before they recurve. The ridges about the centre, the ones containing the point of core of the loops have their exits on the same side of delta.

e) Twinned Loop: In this pattern there are two distinct loops, one resting upon or encircling the other and the ridges, containing the point of core have their exit towards different deltas.

2.8.4. Arch : These are characterized by a slight rise (elevation) in the ridges which enter on side of the finger pattern and exit on the opposite side. The arches are of two sub types -plain arch and tented arch. Neither the plain arch nor the tented arch has a delta formation.

a. Plain arch: Is the most simple of all the fingerprint patterns, and is easily distinguished. In plain arches the ridges enter on one side of the impression and flow or tend to flow out on the other side with a rise or wave in the centre. There may be numerous ridge formations such a ending ridges, bifurcations, dots and islands involved in this type of pattern, but they all tend to follow the general ridge contour, i.e., they enter on one side, make a rise or a wave in the centre and flow or tend to flow out on the other side. Plain arch is denoted by the letter “A”.

***b. Tented arch* :** Is the one which most of the ridges enter upon one side of the impression and flow or tend to flow out upon the other side as in the plain arch type; however the ridge or ridges at the center do

not. Tented arches and some forms of loops are often confused. It should be remembered that the more converging of two ridges does not form a recurve, without which there can be no loop formation. Tented arch is denoted by the letter “T” or “AT”.

c. Exceptional Arch: Their structure is more varied than that of ordinary tented arches, and may include some of the characteristics of a loop although not enough to give them a loop classification. Expectional arch is denoted by the letter “EA”

d. Accidentals : Are certain composite patterns within the whorl group as they occur very rarely and are formed purely by chance. Accidentals are the complex patterns usually composed of different configurations in one pattern, such as tented arch and loop, or loop and whorl etc or any other such combinations which do not fit appropriately in the basic pattern types. This is denoted by a letter “X”. [3]

2.9.0 HENRY SYSTEM

Classification of fingerprints of 10 digits became inevitable when large voluminous collections of the fingerprints at Bureau posed problem for searching and reference. In order to minimize the labour of searching in

large voluminous collections, various classification systems were evolved. These systems have devised variety of so-called classification system in which numbers: letters and other symbols are selected to indicate certain pattern characteristics.

There are nearly fifty such methods in use throughout the different countries of the world. The method in almost universal use is known as the "Galton-Henry Method" or the "Henry System", its name being derived from its originators, Sir Francis Galton and Sir Edward Richard Henry. [43]

Under Henry system, fingerprints are in two classes those, which are given numerical value and those which are not. Whorls and composites have numerical value. Arches and Loops are not having any numerical value. All the patterns are divided as follows; [43]

A.Patterns having no numerical value

S.No.		Subdivided	Symbol
1	Arches	Plain arches Tented arches	A T
2.	Loops	Radial Ulnar	R U

B. Patterns to which numerical values are assigned

		Sub Divided	Symbol
3.	Whorls (plain)	Inner Meet Outer	I M O
4.	Composites a. Central pocket loops b. Twinned loops c. Lateral pocket loops d. Accidentals	 Like whorls Like whorls Like whorls Like whorls	 CP TL LP AC

2.9.1 The Primary Classification[42]

In the primary classification whorls are allocated for the presence of whorl pattern in different fingers of each hand. For presence of a whorl in the right thumb or right index finger sixteen scores are awarded. If whorls are present in the right middle or right ring finger then eight scores are awarded for each place. For whorl, in right little finger or left thumb four scores are allowed for each place. For whorls at left index or middle finger two scores and for whorls at left ring or left little finger one score is awarded for fingers where no whorls are present. The scores are then arranged as below:

$$\frac{R.T + R.R + L.T + L.M + L.L + I}{R.I + R.M + R.L + L.I + L.R + I}$$

RI = Right Index, RT = Right Thumb etc

In both numerator and denominator positions one score is added for convenience of calculation. Thus if whorl is present in each finger then counting being as follows:

$$\frac{16+8+4+2+1+1}{16+8+4+2+1+1} = \frac{32}{32}$$

At the next stage the total score at the numerator is multiplied by the total score at the denominator. This gives the maximum of 32 x 32 = 1024 score.

If one is present in any of the fingers then the score distribution will be:

$$\frac{0+0+0+0+0+1}{0+0+0+0+0+1} = \frac{1}{1}$$

OR

1x 1 = 1 will be the total score.

2.9.2 This way by presence of whorl in fingers any number from 1 to 1024 can be the total score. On the basis of this scoring a total of 1024 boxes are made of each are termed “pigeon holes”. According to the total score of a person his fingerprint is preserved in the box, bearing the same number.

In 60% of the world population there is no whorl in any finger. For all of them the score on primary classification is 1. But there are other subsequent classifications which distribute the fingerprints efficiently, so

that when necessary for comparative study with another, the desired fingerprint can be very easily and quickly searched out.

2.9.3 Secondary Classification: 43

The patterns occurring in the index finger constitute the secondary classification. The patterns are always indicated by capital letters. The right index finger being considered the new numerator and the left index the denominator. If arch is in right index and ulnar loop is in the left index then the secondary will be A/U.

Group or Sub Secondary: The patents of whorl and loops of index and middle fingers of both hands comprise this group. Actually the ridge tracing of whorls (I, M, O) and count of loops (I & O) of index and middle fingers are considered. In ridge tracing of whorls-trace from the lower branch of the left delta, following it towards right delta.

Outer (O): If it passes outside by three or more ridges, it is an outer.

Inner (I) : If it passes inside the right delta by the three or more ridges, it is considered as inner.

Meeting (M) : If it meets the right delta or passes inside or outside by less than three ridges as it is designated as meeting.

2.9.4 Automated Fingerprint Identification System (AFIS) 43

The Henry system and its sub classifications have proven to be a cumbersome system for storing, retrieving and searching for fingerprints particularly as fingerprint collection enlarges.

The manual approach was the only viable approach to the maintenance of fingerprint collection till the emergence of fingerprint technology. Since 1970, technological advances have made possible the classification and retrieval of the fingerprint by computers.

The heart of AFIS technology is the ability of a computer to scan and digitally encode fingerprints so that they can be subjected to a high speed computer processing. The AFIS uses automatic scanning devices that can convert the image of a fingerprint into digital minute that contains data showing ridges (bifurcations). The relative position and orientation of the minutiae are also determined allowing the computer to store each fingerprint in the form of a digitally recorded geometric pattern. The

computer search determines the degree of correlation between the location and relationship of the minutiae for both the search and file prints. In this manner computer can make thousands of fingerprint comparisons in a second.

During this search for the match, the computer uses a scanning system that assigns prints to each of the criteria set by an operator. When the search is complete, the computer then produces a list of file prints that have closest correlation to search prints. The final verification is made by trained fingerprint expert who will examine all the selected prints. Prior to the AFIS police were usually restricted to searching crime scene fingerprints against those of known suspects. Now with the speed and accuracy of ten fingerprints processing by AFIS it is possible to search latent crime scene fingerprints against an entire file's print collection database.

AFIS has brought a fundamental change in the way criminal investigations operate, allowing them to spend less time and developing suspect lists and more time in investigating the suspects generated by the computer. [42]

2.9.5 Methods of detecting fingerprints: [5]

Fingerprints are the most definitive types of physical evidence. All the objects at the scene of crime should be considered as possible evidence of fingerprints. Fingerprints left by the culprit at the scene of crime are known as “Chance Prints”. These prints are left by the criminal unconsciously, and are rightly called as “burglar’s visiting cards”. There are three main classes of chance prints as described below:

Visible prints: These are the prints formed when fingers are smeared with some coloured material such as paint, ink, dirt, blood or other visible material. Prints of this type are less often found, because the person who leaves them can easily see and take care to remove them. If by chance they are still found then they could be there as a result of haste or inattention. Prints of this nature do not need any development.

They can be easily recorded by taking photographs with or without use of filters.

Plastic prints: These are generally found on pliable surface and are called plastic prints. Plastic prints are generally found on objects such as soap, mud, pitch, candles, thick dried blood, melted wax or paraffin, adhesives

and so on. Prints of this nature can be photographed by angular illumination. Fingerprints on candle can also be intensified by rolling over them a thick layer of printer's ink by means of rubber roller and then taking a photograph.

Latent prints: The most important of the chance prints are the latent or invisible prints. The prints have very poor visibility and can be made clearly visible after suitable development. Latent prints are formed by the deposition of the colorless greasy substance from the palmar surface of the fingers. This greasy substance is formed out of perspiration, dirt, and oily matter from the face, hair, skin, tools etc which is carried by the fingers.

Locating latent print is obviously a much more difficult task and does require the utilization of technique that will visualize the print. The method of choice will depend on the type of surface that is being examined. Print found on hard and non absorbable surfaces e.g glass, mirror etc are preferably developed by the application of the powder, whereas prints on the soft and porous surface like paper, cardboard, cloth needs to be treated with chemical.

Development of latent prints: There are two general methods for developing latent fingerprints, physical and chemical. Physical methods are based on the fact that perspiration and greasy matter retain certain substances without fusion e.g. powder dusting and iodine fuming. Chemical techniques alter the components of perspiration directly, causing a reaction giving rise to certain colouration eg: Ninhydrin and silver nitrate. Since a number of methods exist for the development, it is important to determine which method will give the best results.

2.9.6 Powder Development Techniques: [5]

A fingerprint developing is usually provided with black, grey and anthracene fingerprint powders. Some kits also provide silver, red and gold colour fingerprint powders.

1. Black powder: The basic ingredients of black powder are lamp black, graphite and charcoal.
2. Grey/white powder: This give excellent result consists of mercury and chalk. Various other formulations like white powder consisting of titanium dioxide, zinc oxide and acacia are also available.

3. Red Powder: Also known as Dragon's Blood is a finely powdered resin from the fruit of a palm that is used in the manufacture of zinc engravings. When a latent print is developed with dragon's blood and heat is applied to it, a fine print will appear.
4. Silver Powder: The main ingredient of this powder is fine aluminium dust. In trace is used on hard surfaces, which are polished or varnished and on objects like feather, cellophane etc.
5. Fluorescence powder: When fingerprints have to be developed on a multicoloured surfaces such as multicolored cartoons, magazine covers, calendars, tins etc., these powders are used. The developed prints are then removed to the dark room and exposed to ultraviolet light. The latent impressions fluoresce and can be photographed without any interference from the colored background.

2.10 Technical aspects of Fingerprint collection and analysis

2.10.1 Applying Powder:[5]

A variety of techniques are used for the purpose of developing latent prints the most popular being a camel or squirrel hairbrush. Ostrich feather brush is also quite popular. For successful development, powder is applied into a powder container and tapping powder on the developing surface. As

powder is brushed over an area containing a latent print, particles adhere to greasy deposits. Only ridge patterns stand out from the contrasting background. Good results are obtained only when powder is applied sparingly. Brush strokes must be gentle. Once the outline of a pattern is seen, the brush movements are made along the flow of ridges. This helps in removing excess powder adhering between the ridges without damaging the ridges.

2.10.2 Magna brush development

This is a special type of brush powder technique. The powder used is essentially magnetic in character. The bristle less brush when brought near the powder attracts the dust to its tip. Later the brush is brought near the latent print. On releasing the magnetic contact the powder drops on the surface showing off the print. The method is quite inexpensive and it allows the development of latent prints on porous surfaces such as raw wood, leather, paper etc it however cannot be used on metallic objects.

2.11 Chemical methods of developing Fingerprints

2.11.1 Iodine fuming development: This method for visualizing the latent prints is the oldest. This method is useful in porous surfaces such as paper, cardboard and plaster wall, where the fats oils of greasy prints get absorbed on the surface. When vapours of iodine are forced on the surface, fatty and oily deposits physically absorb the iodine fumes and the print gets developed to yellow-brown colour. The developed prints should be photographed immediately as otherwise the prints fade due to the release of iodine from the prints. Iodine developed prints can be fixed with 1% starch solution. The print will turn blue and can be expected to last for several weeks to several months**.** [5]

2.11.2 Silver Nitrate Development: With the passage of time, but the salt from the perspiration persists indefinitely. If an aqueous solution of silver nitrate, about 3% is allowed to act on latent print, a chemical reaction occurs between sodium chloride and silver nitrate producing a photosensitive silver chloride. The dried object when exposed to light source shows a dark developed print. The developed print can remain for many years. This method is particularly useful for paper, cardboard and even unpainted wood**.**[5]

2.11.3 Ninhydrin development: This method is fairly recent, very old prints, where the powders are not likely to adhere to the prints and the iodine fuming or silver nitrate development also are not likely to succeed, can be developed by this process. Ninhydrin reacts with amino acids present in human perspiration giving rise to absent pink or purple coloured print. The development of prints is hastened by application of heat. This has been used almost exclusively for prints on paper. This method should be used after the iodine method but before the silver nitrate process**.** [5]

Other methods of fingerprint development

2.12. **Laser light** has revolutionized the fingerprint technology. Laser method developed by Ontario provincial police and Xerox research centre in Canada Laser takes the advantage of the fact that perspiration contains a variety of component that fluoresces when illuminated by laser light. It has been found that latent fingerprint residue contains a variety of organic substances like oils, paint and inks which have inherent luminescence property.

Using a continuous argon ion laser and observing through suitable filters, latent fingerprints show luminescence. These prints can be photographed using special filters. If inherent luminescence fails to detect

latent fingerprint through lasers, the same can be treated with fluorescent material like coumarin-6 to give induced luminescence to latent fingerprint. Very old prints even as old as ten years can be developed using laser method on surfaces like plastic, rubber, painted walls, paper, wood, leather etc.,

The main advantage of laser beam over the conventional fingerprint development methods is its capability to develop latent prints that cannot be developed by any other method. It is highly sensitive method, and does not suffer from any time limitation. The developed prints show off markedly under laser source. This method is highly evolved and can become the method of choice to be followed by other conventional methods.

2.13 Photographic Method:

The prints obtained by this method are very clear, but because only areas in direct contact can be photographed. The method has only limited value in dermatoglyphic analysis and is expensive. [43]

Fingerprint matching has been used in Forensics and Criminalistics for over a century, and last decade has seen an exponential increase in use of automated fingerprint recognition. Fingerprint recognition is an example of Biometrics. Biometrics is defined as the automated recognition of individuals based on physiological or behavioural characteristics. Fingerprint recognition is among the most widely used biometric systems. [46]

Fingerprint recognition is an important biometric technology and its use is increasing day by day. Fingerprint recognition is affected by several physiological factors like age, wear and tear of skin and technological factors like sensor technologies. [48]

Today, the use of computers for fingerprint matching and identification is highly desirable in many applications. Example include building security systems and police work. In fact, despite the fingerprints

representing unique patterns they possess some similarities in their structures, making the identification of complicated patterns difficult. A complete fingerprints identification system consisting of edge line detection, edge lines thinning, core point detection feature extraction and fingerprint image recognition and identification was introduced. [48]

Ali, Al-Zewary proposed a new fast edge to trace ridge lines of the fingerprint images. Edge line skeleton method, based on edge point categorization, is also introduced. Fingerprint image core point was detected by adaptive technique; core is based in slicing the edge lines into four groups representing the four possible directions (i.e. vertical, horizontal and two diagonals). A set of 34 measure features are proposed for recognizing and identifying fingerprint images.[49]

3. AIMS AND OBJECTIVES

1. To study the Finger print classification and
2. To study the ridge count in finger prints of male and females.

4.MATERIALS AND METHODS

The present study was conducted at Department of Forensic Medicine of Madurai Medical College , Madurai after obtaining ethical committee approval.

3.1 Inclusion Criteria:

Total subjects included were 250 Males and 250 Females. Subjects attending Out Patients Department of Government Rajaji Hospital , Madurai Medical College, Madurai were included in the study.

3.2 Exclusion Criteria:

Subjects where there was any evidence of injury of fingertips that leads change in the fingerprint pattern (Leprosy, scars of the fingertips, lacerations) ;

Informed written consent was obtained prior to taking the fingerprints with proper procedure explained to the subjects.

3.3 Materials: Glass slab – Inking Roller method

The materials which were used for this study are as follows:

1. Printer Black Ink-Kores quick drying duplicating ink.
2. Glass Plate (12x12 inches)

3. Ink roller.
4. A magnifying hand lens was used to study the fingerprints .
5. Pencil.
6. Measuring Scale.
7. Proforma.

3.3.1 Modus Operandi(Method of execution): The subject was asked to wash and dry their hands to remove dirt and grease. For collection of fingerprint, a plain glass plate of 12x12 inches was cleaned uniformly smeared with a thin layer of black printers ink by using the inking roller. The subject was asked to keep his / her arm relaxed and not to try to help in rolling the fingers as this may cause smearing. Then the finger bulbs were rolled on the glass slab- “the thumbs were rolled towards the subject’s body and the fingers were rolled away from the body, i.e., thumb in fingers out method.”

And then the rolled impressions of each finger were obtained in the allotted space for that finger on the proforma. In this way for each and every individual the entire prints of ten fingers were prepared. Only rolled prints were taken i.e. no plain prints.

Statistical Tools

The information collected regarding all the selected cases were recorded in a Master Chart. Data analysis was done with the help of computer using **Epidemiological Information Package (EPI 2010)** developed by Centre for Disease Control, Atlanta.

Using this software range, frequencies, percentages, means, standard deviations, chi square and 'p' values were calculated. Kruskul Wallis chi-square test was used to test the significance of difference between quantitative variables and Yate's chi square test for qualitative variables. A 'p' value less than 0.05 is taken to denote significant relationship.

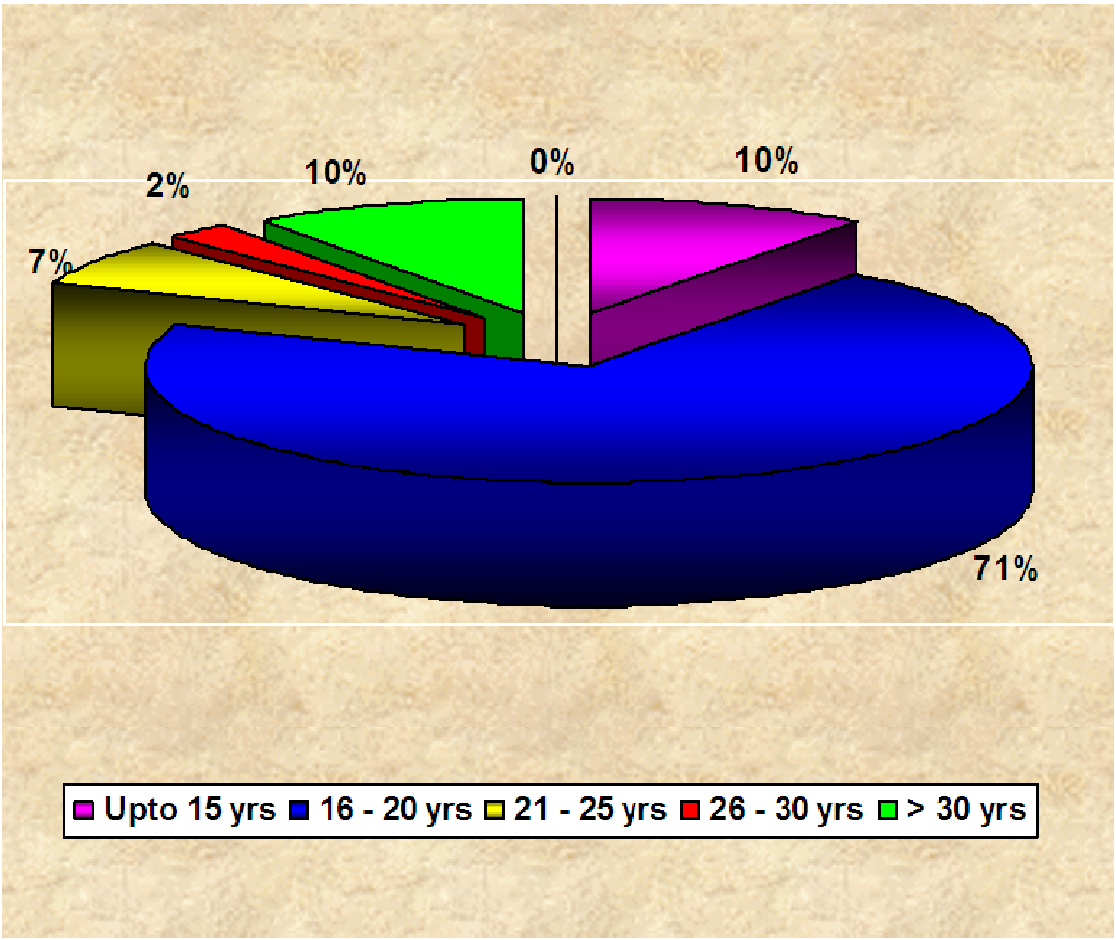
Ridge count calculation was done by calculating Mean of each finger both in Male and Female. **Unpaired 't' test was applied to entertain the resultant "p"** value is the probability role at 0.05 level of significance for the corresponding **degree of freedom (d.f.)**

Thus,

p<0.05 is significant

p>0.05 is not significant

AGE DISTRIBUTION



RESULTS

A : CHARACTERISTICS OF CASES STUDIED

Table 1 : Age distribution

Age group	Cases	
	No	%
Upto 15 years	51	10.2
16 – 20 years	354	70.8
21- 25 years	33	6.6
26 – 30 years	12	2.4
> 30	50	10
Total	500	100
Range	13 – 60 years	
Mean	20.6 years	
SD	7.2 years	

Age group of cases included in the study ranged from 13 to 60 years. Majority of the cases (81%) were aged 20 years and below. The study group had an mean age of 20.6 years.

SEX DISTRIBUTION

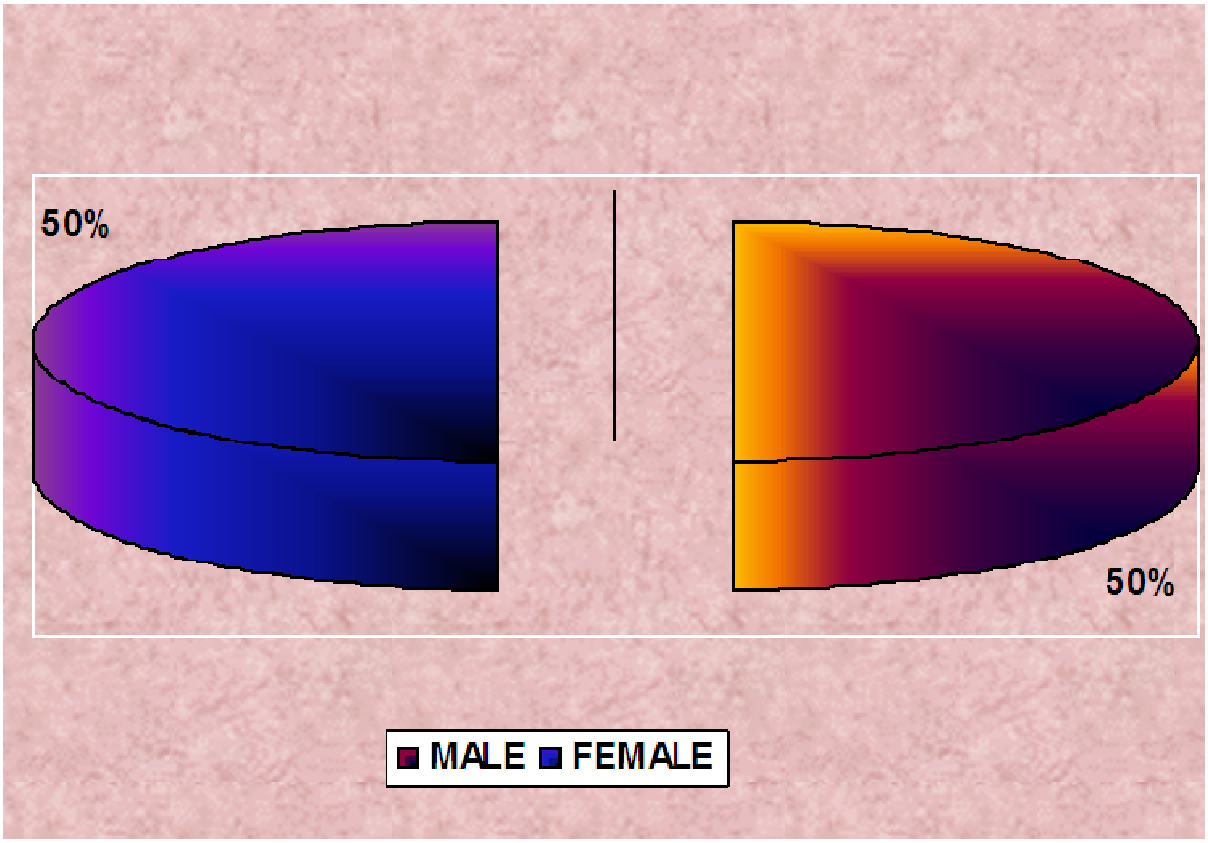
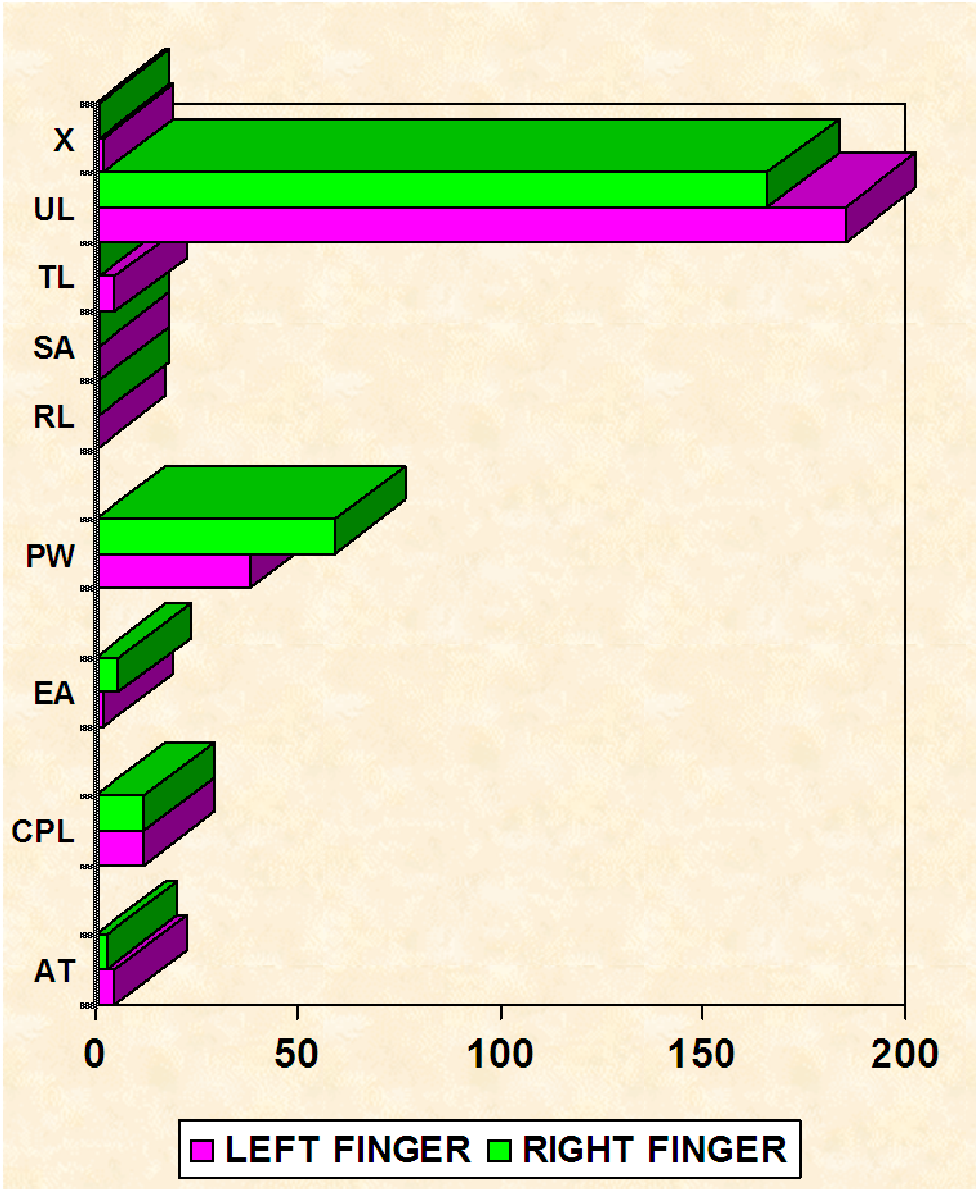


Table 2 : Sex distribution

Sex	Cases	
	No	**%**
Male	250	50
Female	250	50
Total	500	100

250 males and 250 females were included in the study.

FINGER PRINT PATTERN OF LITTLE FINGER IN MALES



B : FINGER PRINT PATTERN OF MALES

Table 3 : Pattern of little finger in both hands

Pattern	Little finger			
	Left		Right	
	No	%	No	%
Tented Arch	5	2	3	1.2
Central Pocket Loop	12	4.8	12	4.8
Exceptional Arch	2	0.8	6	2.4
Plain Whorl	38	15.2	59	23.6
Radial Loop	-	-	1	0.4
Simple Arch	1	0.4	1	0.4
Twinned Loop	5	2.0	1	0.4
Ulnar Loop	185	74.0	166	66.4
Accidentals(X)	2	0.8	1	0.4
Total	250	100	250	100

Among males included in the study, Ulnar Loop was the predominant pattern of little finger in the left (74%) hand and right hand (66.4%) followed by Plain Whorl (15.2% and 23.6%).

FINGER PRINT PATTERN OF RING FINGER IN MALES

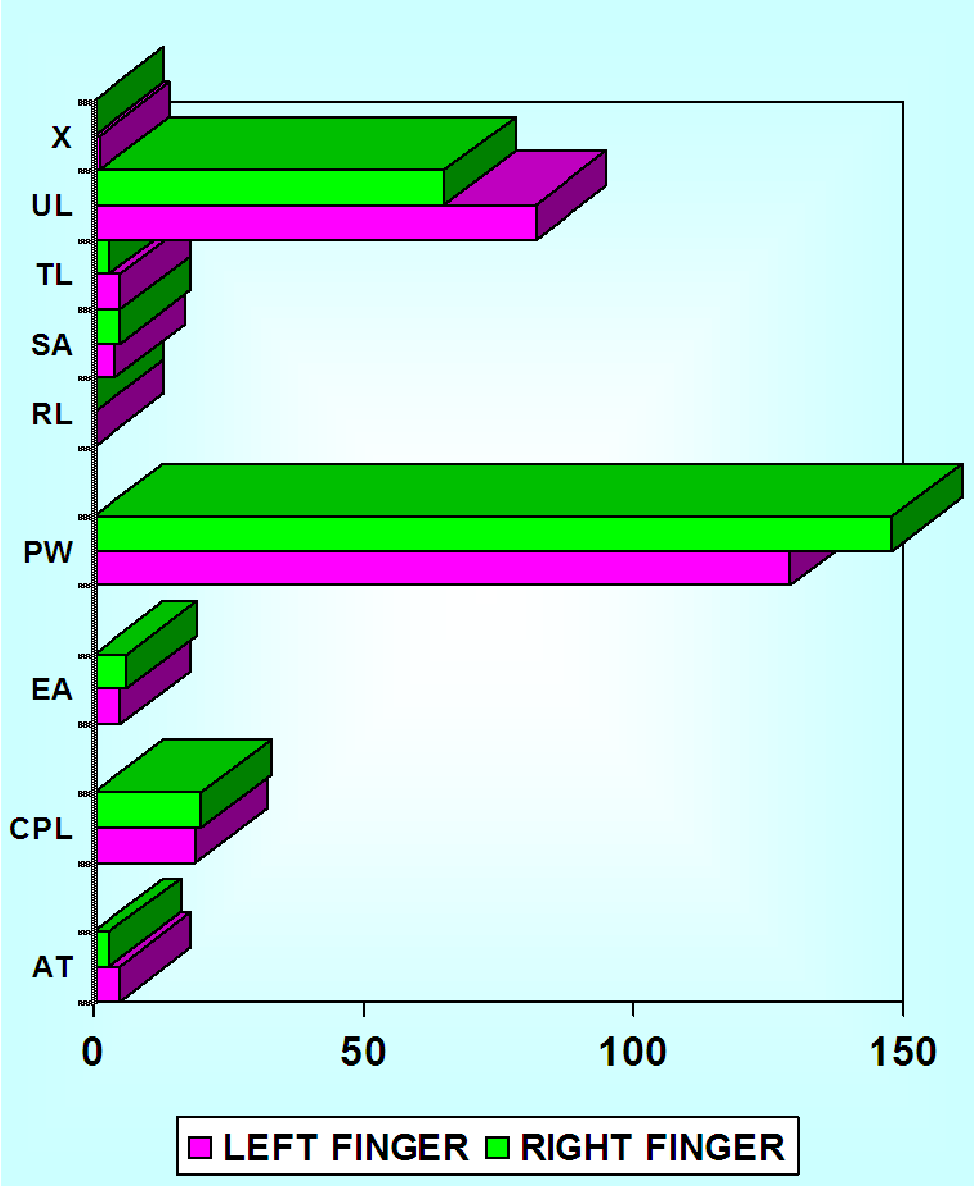


Table 4 : Pattern of ring finger in both hands

Pattern	Ring finger			
	Left		Right	
	No	%	No	%
Tented Arch	5	2.0	3	1.2
Central Pocket Loop	19	7.6	20	8.0
Exceptional Arch	5	2.0	6	2.4
Plain Whorl	129	51.6	148	59.2
Radial Loop	-	-	-	-
Simple Arch	4	1.6	5	2.0
Twinned Loop	5	2.0	3	1.2
Ulnar Loop	82	32.8	65	26
Accidentals(X)	1	0.4	-	-
Total	250	100	250	100

In the ring finger of males plain whorl was present in majority of cases (51.6% in left hand and 59.2%) in right hand.

FINGER PRINT PATTERN OF MIDDLE FINGER IN MALES

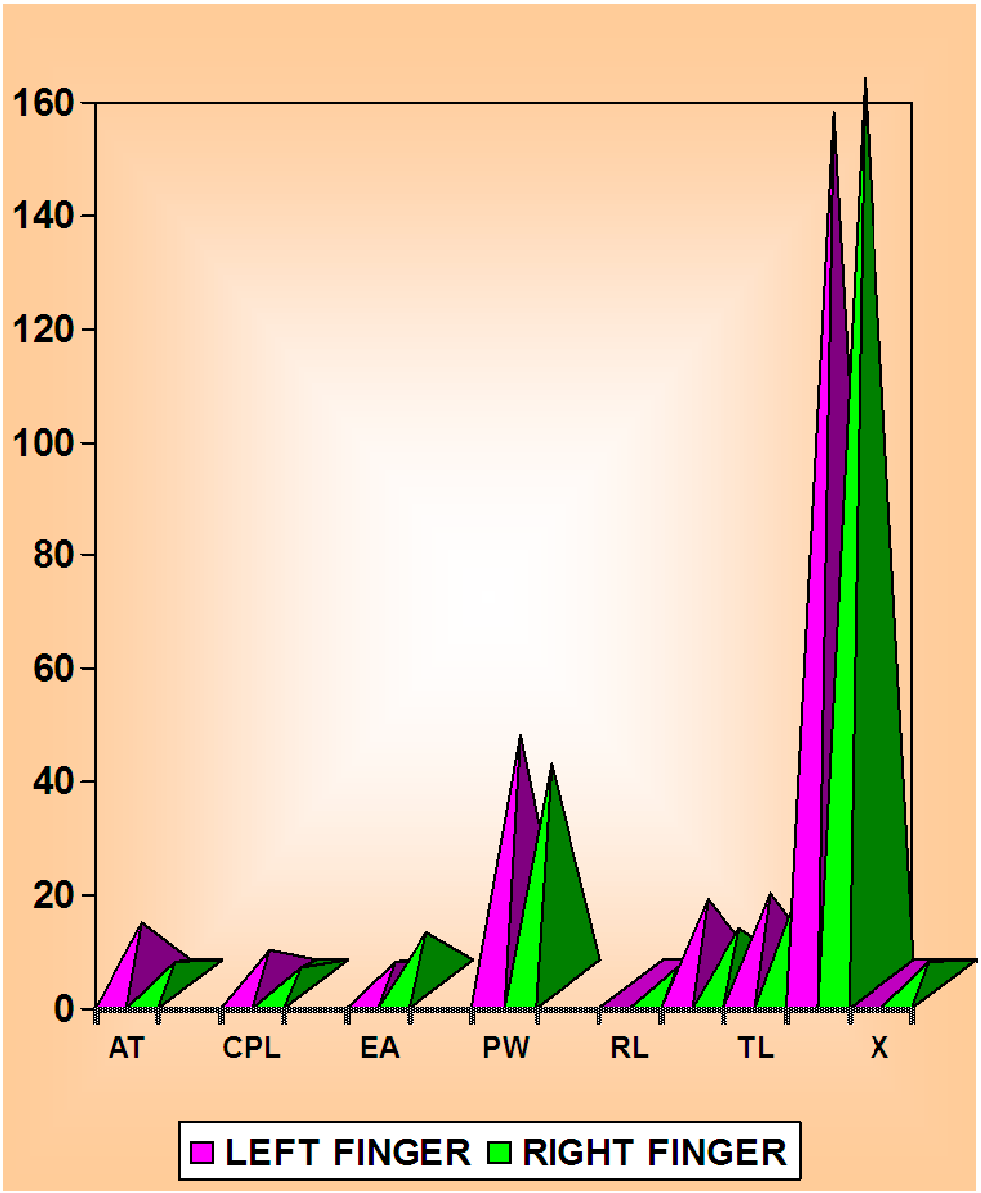


Table 5 : Pattern of middle finger in both hands

Pattern	Middle finger			
	Left		Right	
	No	%	No	%
Tented Arch	11	4.4	4	1.6
Central Pocket Loop	6	2.4	3	1.2
Exceptional Arch	4	1.6	9	3.6
Plain Whorl	44	17.6	39	15.6
Radial Loop	-	-	3	1.2
Simple Arch	15	6.0	10	4.0
Twinned Loop	16	6.4	18	7.2
Ulnar Loop	154	61.6	160	64
Accidentals (X)	-	-	4	1.6
Total	250	100	250	100

Ulnar Loop was present in maximum percentage of cases (61.6% in left hand and 64% in right hand) in the middle finger of males.

FINGER PRINT PATTERN OF INDEX FINGER IN MALES

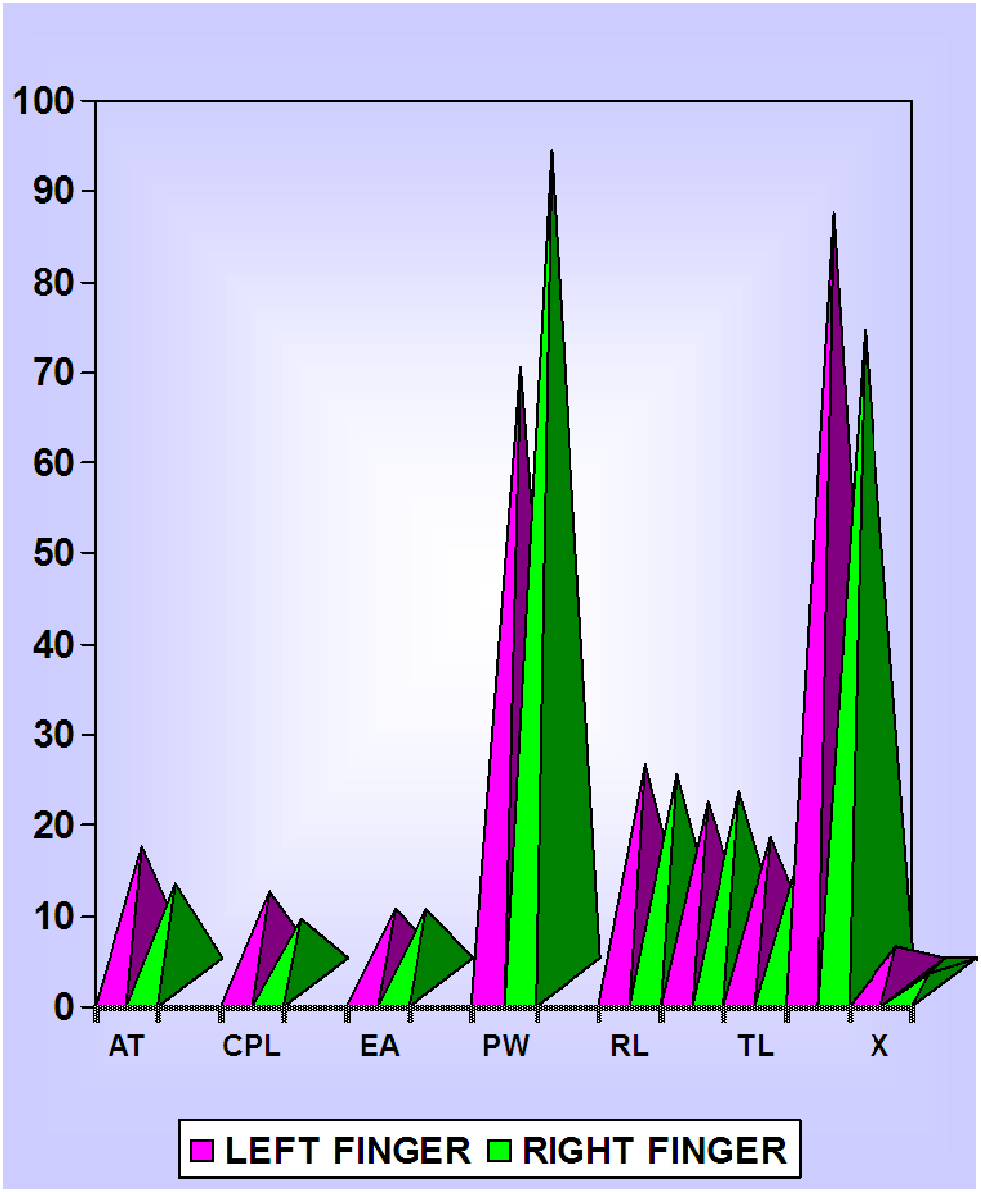


Table 6 : Pattern of index finger in both hands

Pattern	Index finger			
	Left		Right	
	No	%	No	%
Tented Arch	15	6.0	11	4.4
Central Pocket Loop	10	4.0	7	2.8
Exceptional Arch	8	3.2	8	3.2
Plain Whorl	68	27.2	92	36.8
Radial Loop	24	9.6	23	9.2
Simple Arch	20	8.0	21	8.4
Twinned Loop	16	6.4	15	6.0
Ulnar Loop	85	34	72	22.8
Accidentals(X)	4	1.6	1	0.4
Total	250	100	250	100

The predominant pattern of the index finger of males was Ulnar Loop in the left hand (34%) and plain whorl in the right hand (36.8%).

FINGER PRINT PATTERN OF THUMB FINGER IN MALES

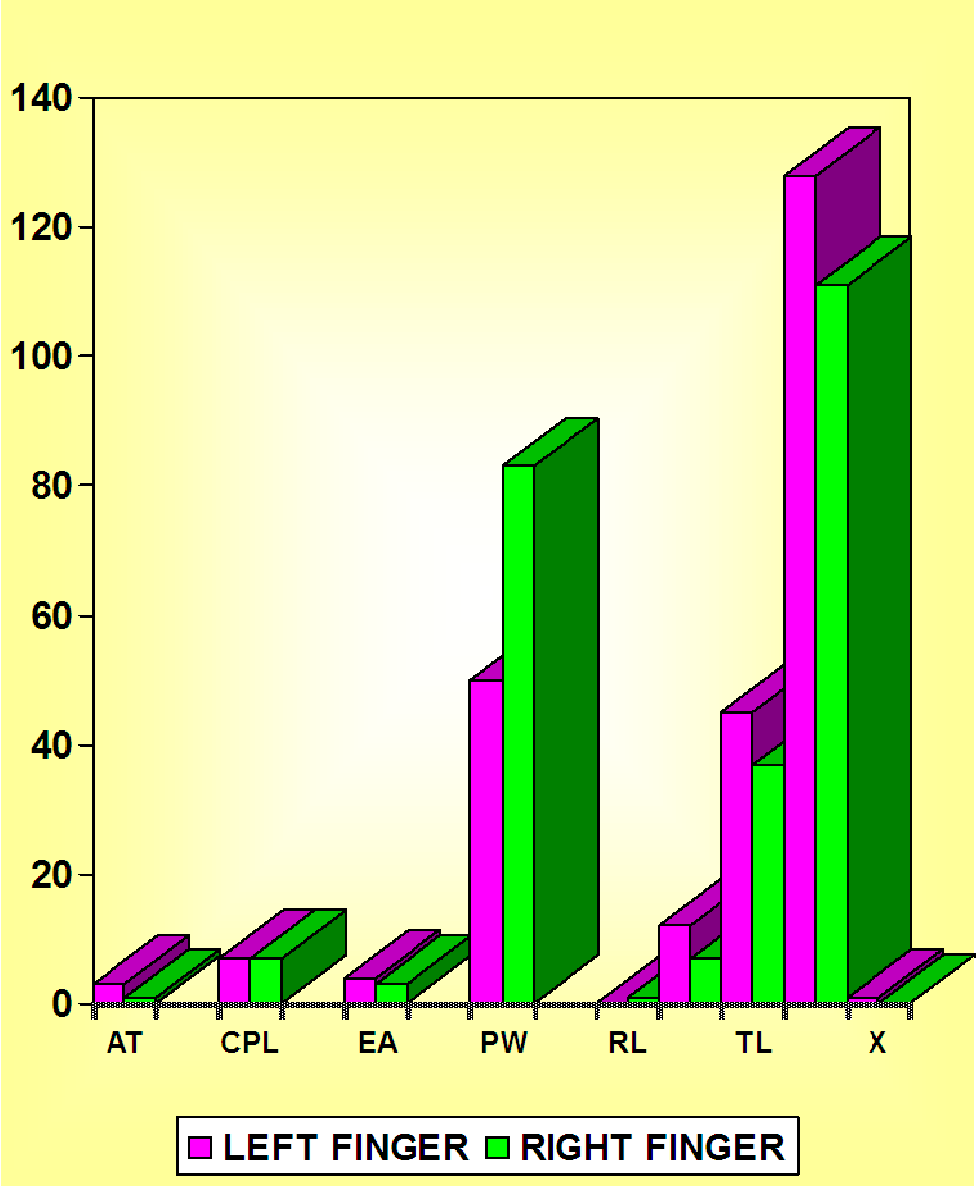
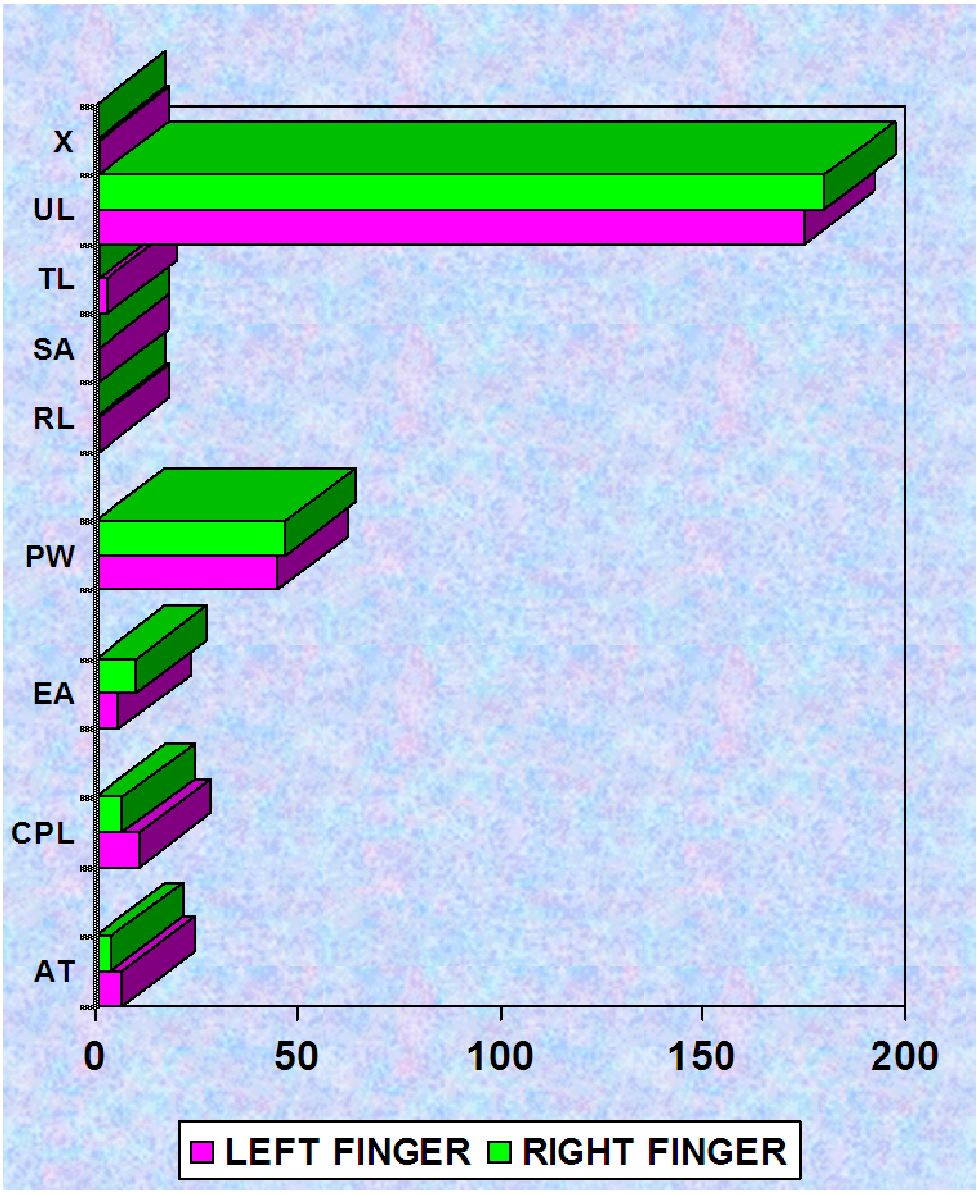


Table 7 : Pattern of thumb finger in both hands

Pattern	Thumb			
	Left		Right	
	No	%	No	%
Tented Arch	3	1.2	1	0.4
Central Pocket Loop	7	2.8	7	2.8
Exceptional Arch	4	1.6	3	1.2
Plain Whorl	50	20	83	33.2
Radial Loop	-	-	1	0.4
Simple Arch	12	4.8	7	2.8
Twinned Loop	45	18	37	14.8
Ulnar Loop	128	51.2	111	44.4
Accidentals (X)	1	0.4	-	-
Total	250	100	250	100

Ulnar Loop was present in majority of cases in the thumb fingers of males included in the study (51.2% in left hand and 44.4% in the right hand).

FINGER PRINT PATTERN OF LITTLE FINGER IN FEMALES



C : Finger print pattern of females

Table 8 : Little finger patterns

Pattern	Little finger			
	Left		Right	
	No	%	No	%
Tented Arch	7	2.8	4	1.6
Central Pocket Loop	11	4.4	7	2.8
Exceptional Arch	6	2.4	10	4.0
Plain Whorl	45	18	47	18.8
Radial Loop	1	0.4	-	-
Simple Arch	1	0.4	1	0.4
Twinned Loop	3	1.2	1	0.4
Ulnar Loop	175	70.0	180	72
Accidentals (X)	1	0.4	-	-
Total	250	100	250	100

Nearly three fourth of the left and right hand little fingers of females studied exhibited Ulnar Loop pattern.

FINGER PRINT PATTERN OF RING FINGER IN FEMALES

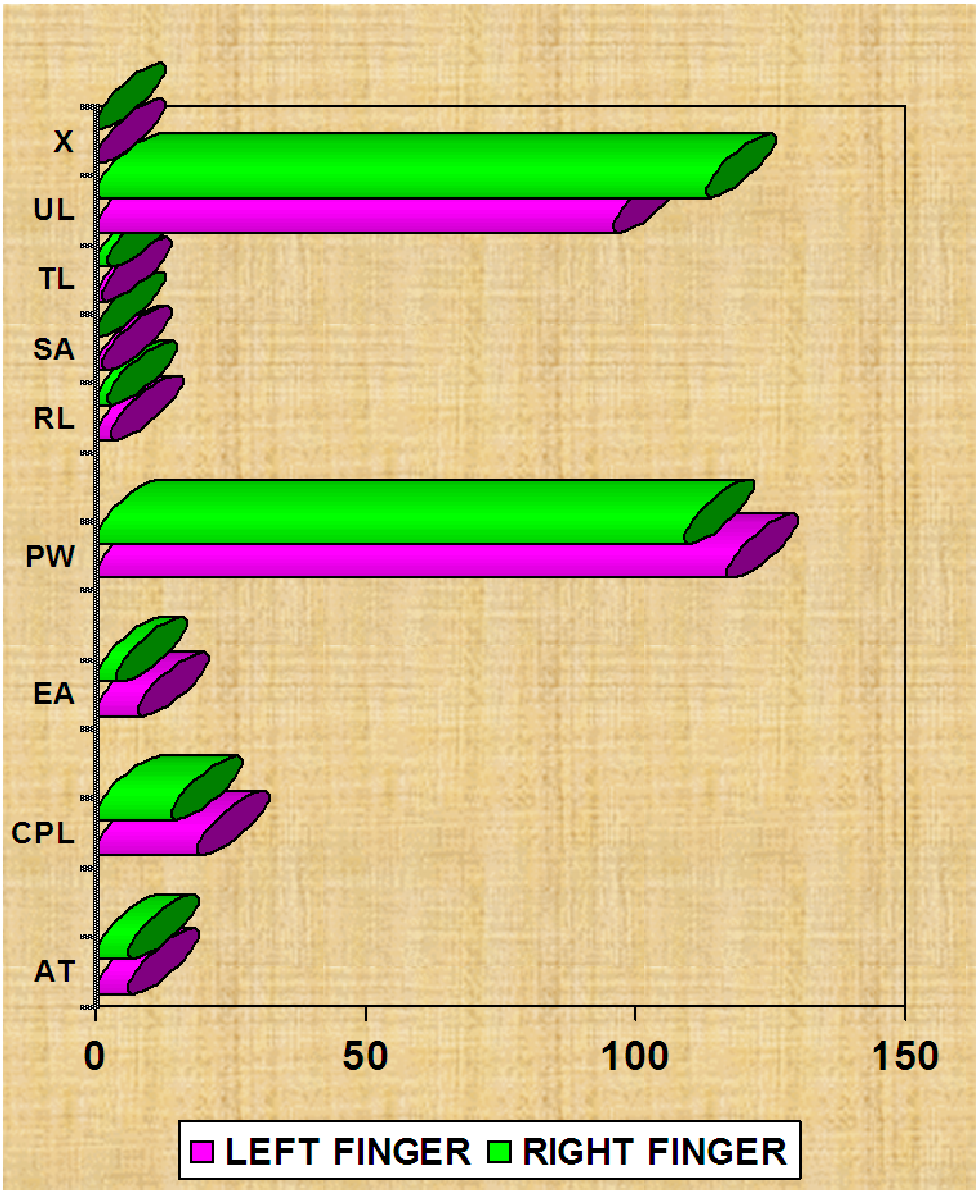


Table 9 : Ring finger patterns

Pattern	Ring finger			
	Left		Right	
	No	%	No	%
Tented Arch	6	2.4	6	2.4
Central Pocket Loop	19	7.6	14	5.6
Exceptional Arch	8	3.2	4	1.6
Plain Whorl	117	46.8	109	43.6
Radial Loop	3	1.2	2	0.8
Simple Arch	1	0.4	-	-
Twinned Loop	1	0.4	2	0.8
Ulnar Loop	95	38	113	45.2
Accidentals (X)	-	-	-	-
Total	250	100	250	100

Plain whorl was the predominant pattern (46.8% in the left hand and 43.6% in the right hand) in the ring finger of females in this study group.

FINGER PRINT PATTERN OF MIDDLE FINGER IN FEMALES

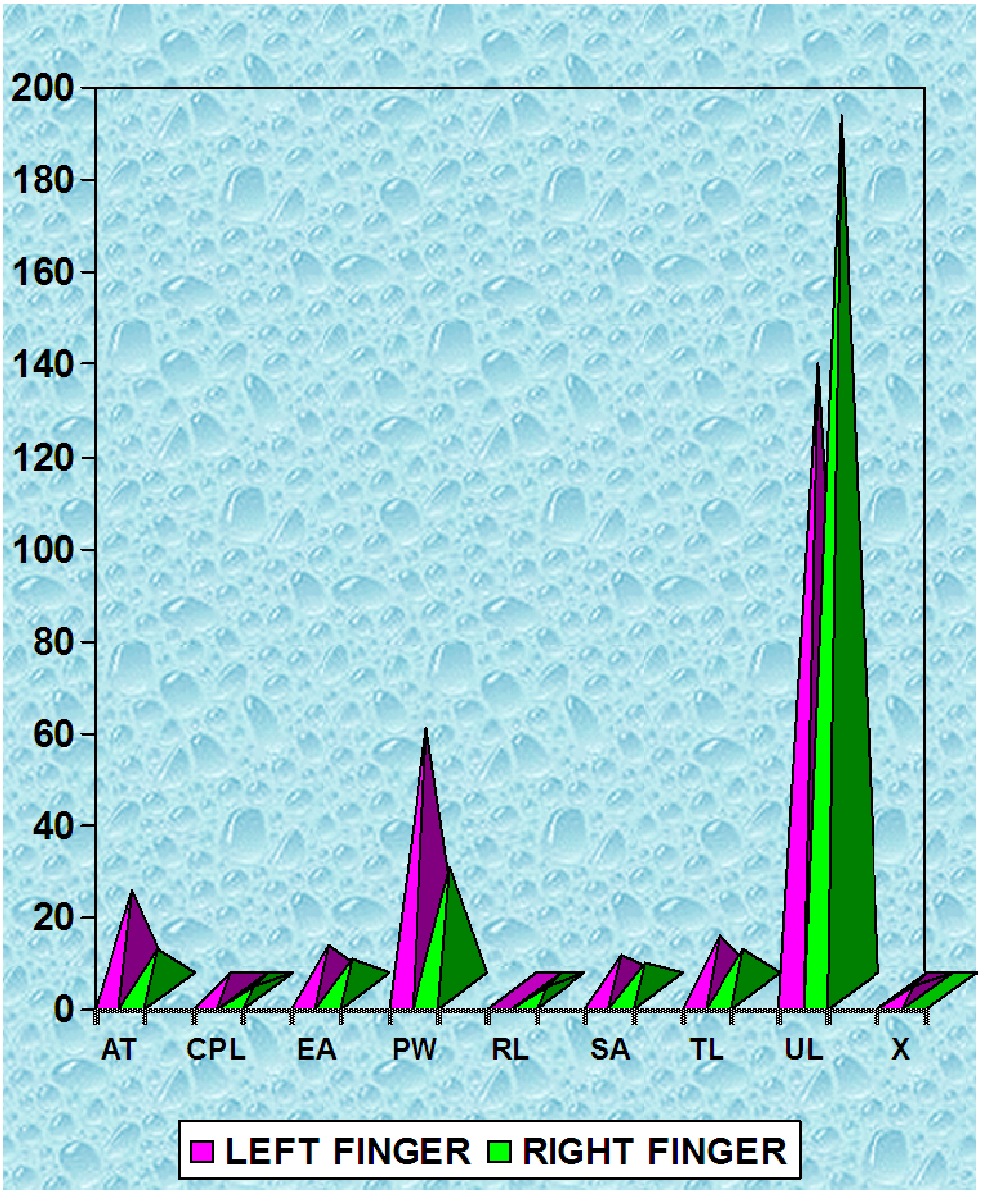


Table 10 : Female middle finger pattern

Pattern	Middle finger			
	Left		Right	
	No	%	No	%
Tented Arch	22	8.8	9	3.6
Central Pocket Loop	4	1.6	1	0.4
Exceptional Arch	10	4.0	7	2.8
Plain Whorl	57	22.8	27	10.8
Radial Loop	-	-	1	0.4
Simple Arch	8	3.2	6	2.4
Twinned Loop	12	4.8	9	3.6
Ulnar Loop	136	54.4	190	76
Accidentals (X)	1	0.4	-	-
Total	250	100	250	100

Middle finger of females included in the study had Ulnar Loop as the predominant pattern in both hands (54.4% and 76%).

FINGER PRINT PATTERN OF INDEX FINGER IN FEMALES

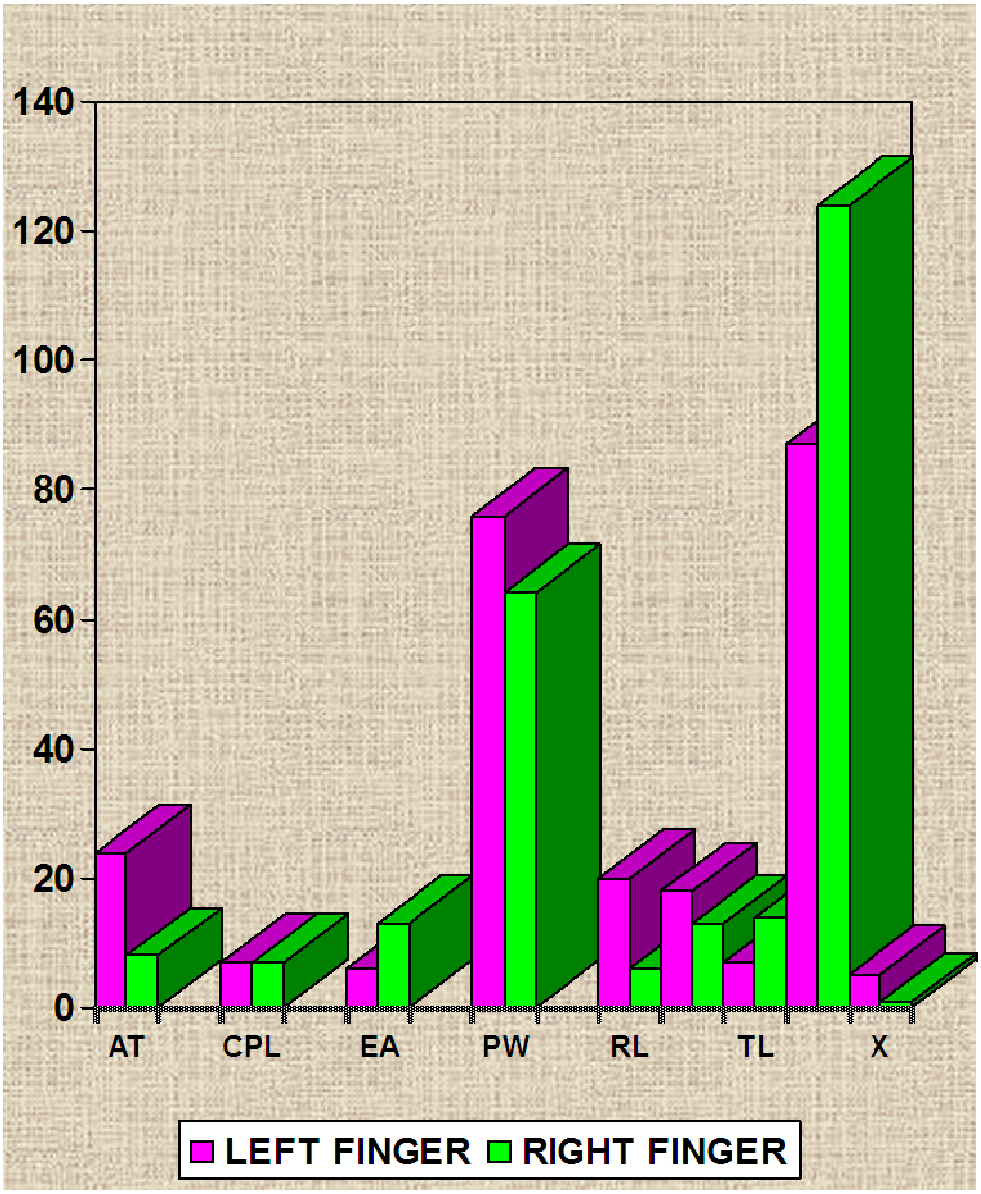


Table 11 : Female index finger pattern

Pattern	Index finger			
	Left		Right	
	No	%	No	%
Tented Arch	24	9.6	8	3.2
Central Pocket Loop	7	2.8	7	2.8
Exceptional Arch	6	2.4	13	5.2
Plain Whorl	76	30.4	64	25.6
Radial Loop	20	8.0	6	2.4
Simple Arch	18	7.2	13	5.2
Twinned Loop	7	2.8	14	5.6
Ulnar Loop	87	34.8	124	49.6
Accidentals (X)	5	2.0	1	0.4
Total	250	100	250	100

Ulnar Loop was present in majority of index fingers of females in the study group (34.8% in left and 49.6% in right hand).

FINGER PRINT PATTERN OF THUMB FINGER IN FEMALES

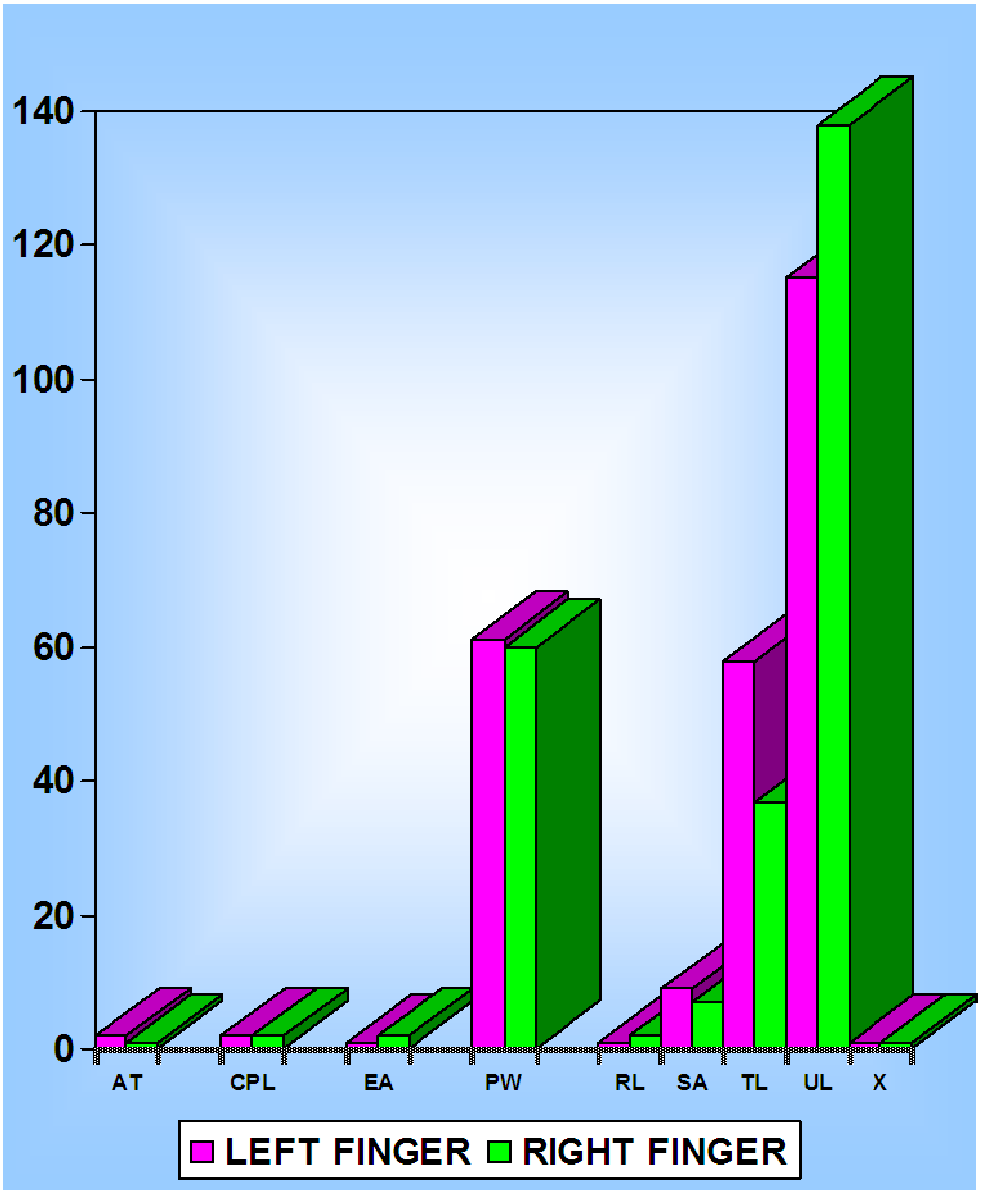


Table 12 : Female thumb fingers pattern

Pattern	Thumb			
	Left		Right	
	No	%	No	%
Tented Arch	2	0.8	1	0.4
Central Pocket Loop	2	0.8	2	0.8
Exceptional Arch	1	0.4	2	0.8
Plain Whorl	61	24.4	60	24.0
Radial Loop	1	0.4	2	0.8
Simple Arch	9	3.6	7	2.8
Twinned Loop	58	23.2	37	14.8
Ulnar Loop	115	46	138	55.2
Accidentals (X)	1	0.4	1	0.4
Total	250	100	250	100

Thumb fingers in 46% of left hand and 55.2% of right hand of females had Ulnar Loop pattern.

FINGER PRINT PATTERN MALES & FEMALES

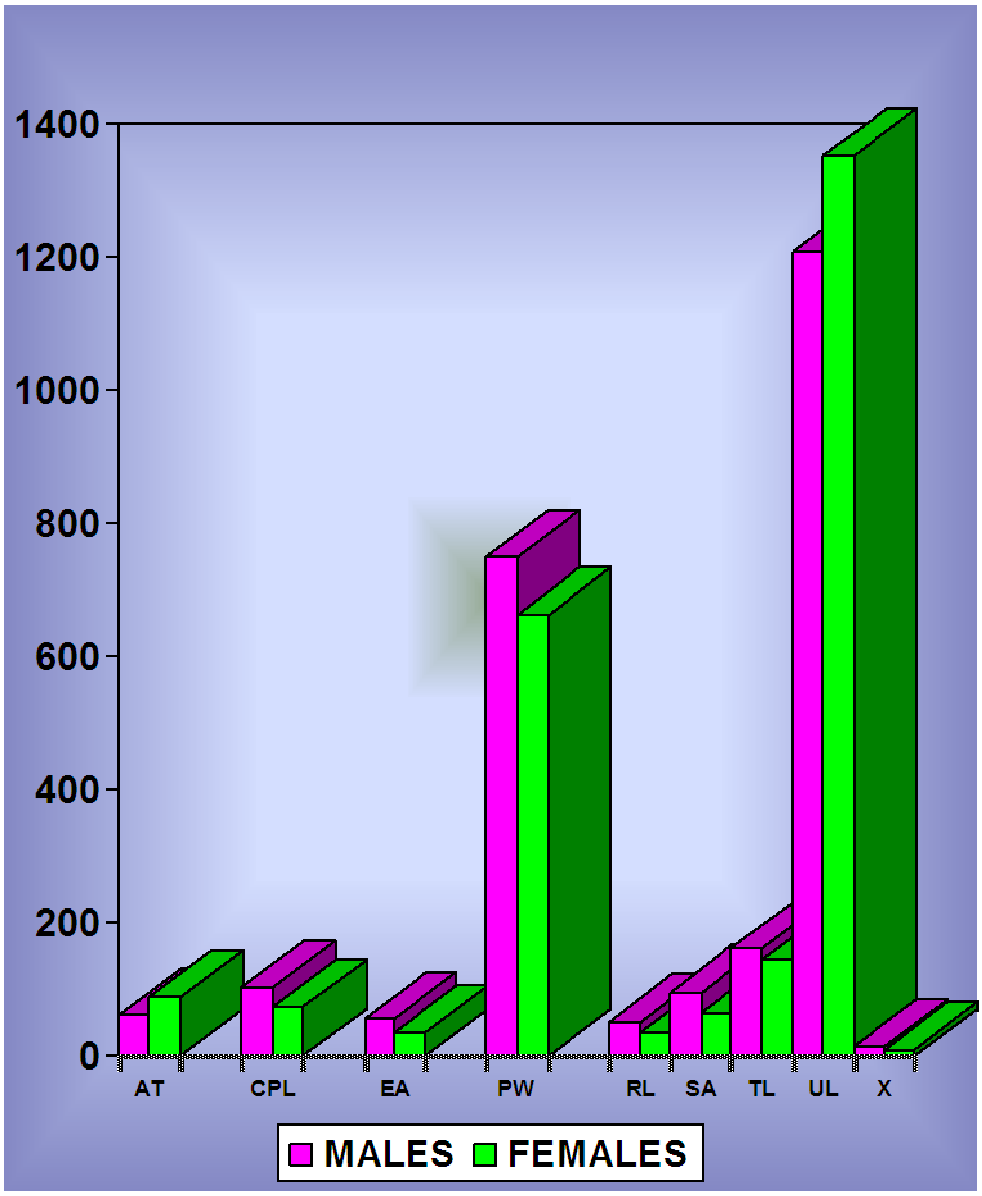


Table 13 : Finger print pattern of males and females

Pattern	Male				Female			
	Left	Right	Total		Left	Right	Total	
			No	%			No	%
AT	39	22	61	2.4	61	28	89	3.6
CPL	54	49	103	4.1	43	31	74	3.0
EA	23	32	55	2.2	31	36	67	2.7
PW	329	421	750	30	356	307	663	26.5
RL	24	28	52	2.1	25	11	36	1.4
SA	52	44	96	3.8	37	27	64	2.6
TL	87	74	161	6.4	81	63	144	5.8
UL	634	574	1208	48.3	608	745	1353	54.1
X	8	6	14	0.6	8	2	10	0.4
Total	1250	1250	2500	100	1250	1250	2500	100

The predominant finger print pattern of males and females was Ulnar Loop (48.3% among males and 54.1% among females) followed by Plain Whorl (30% and 26.5%).

RIDGE COUNT OF ULNAR AND RADIAL LOOPS OF MALES & FEMALES

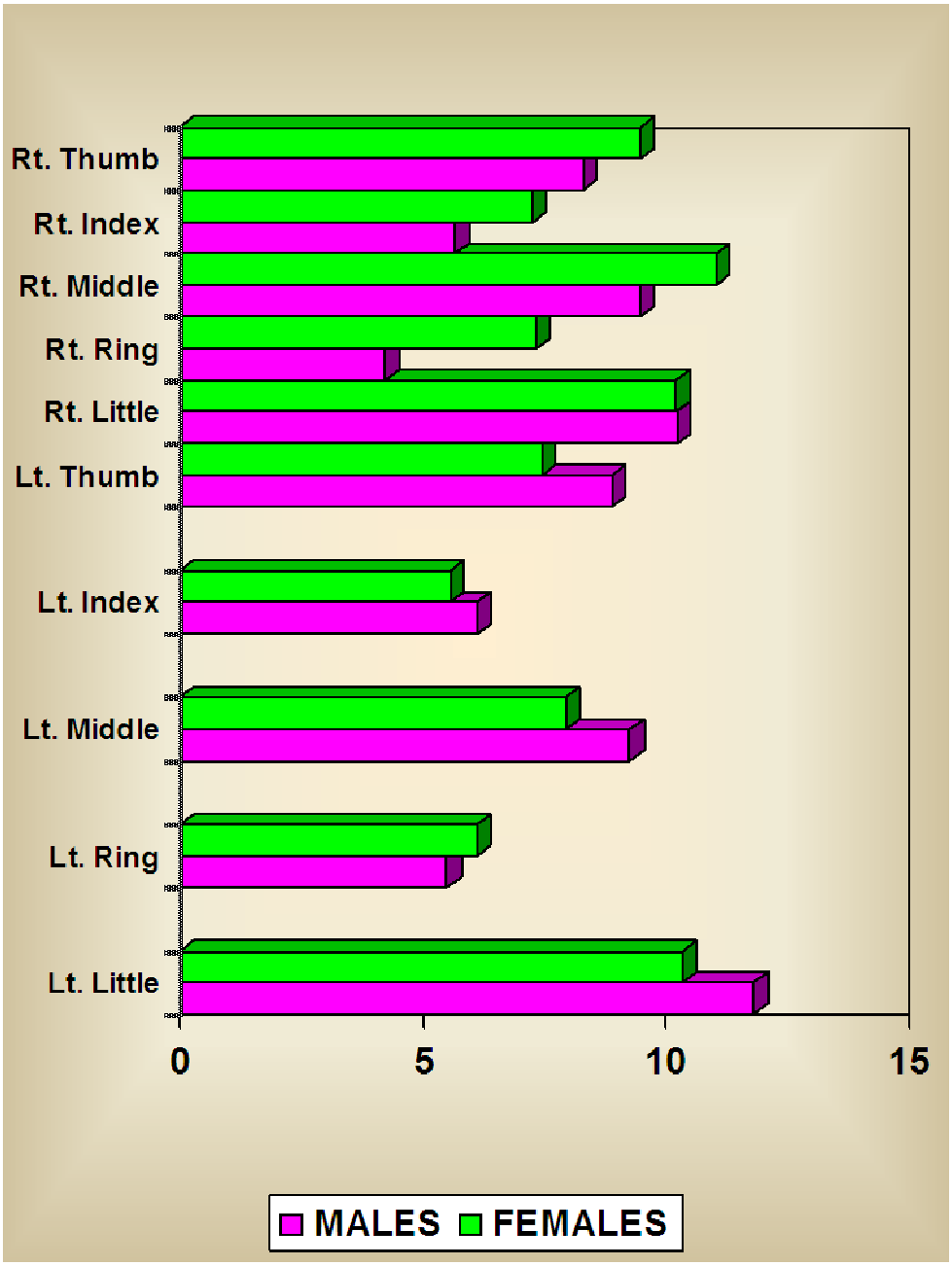


Table 14 : Ridge count of Ulnar and radial loops of all the ten fingers in both males and females

Ridge count of	Male		Female		't' Value	'p' Value
	Mean	SD	Mean	SD		
Left little	11.81	7.35	10.34	7.26	2.25	**0.005 Significant**
Left ring	5.5	7.96	6.11	7.86	0.87	0.3762 Not significant
Left middle	9.26	7.8	7.94	7.5	1.93	**0.0423 Significant**
Left index	6.1	7.44	5.57	6.74	0.83	0.3943 Not significant
Left thumb	8.9	8.91	7.44	8.48	1.88	**0.0476 Significant**
Right little	10.22	7.57	10.21	7.03	0.0061	0.5228 Not significant
Right ring	4.2	7.17	7.32	8.26	4.5031	**0.0001 Significant**
Right middle	9.48	7.4	11.04	6.7	2.4718	**0.0422 Significant**
Right index	5.65	7.61	7.24	7.42	2.3614	**0.0216 Significant**
Right thumb	8.3	9.5	9.48	9.01	1.4152	0.2348 Not significant

Expansion of Abbreviations'

Radial loop	-	RL
Ulnar loop	-	UL
Plain whorl	-	PW
Central pocket loop whorl	-	CPL
Twinned loop	-	TL
Accidental	-	X
Tented arch	-	AT
Simple arch	-	SA
Exceptional arch	-	EA
Left little finger	-	LLF
Right little finger	-	RLF
Left ring finger	-	LRF
Right ring finger	-	RRF
Left Middle Finger	-	LMF
Right Middle Finger	-	RMF
Left Index Finger	-	LIF
Right Index Finger	-	RIF
Left Thumb	-	LTh
Right Thumb	-	RTh

DISCUSSION

Personal identification through fingerprints has long been recognized and is regarded as the greatest contribution to the law enforcement. Through its important characteristics, the science of fingerprint provides a unique service in the administration of justice and also in other areas where positive identification is of paramount importance. [3]

The discovery of uniqueness of fingerprints caused an immediate decline in the prevalent use of anthropormetric methods of identification and led to the adoption of fingerprints as a more efficient method of identification. [7]

In present study 250 Male and 250 Female subjects were included to take fingerprint by glass slab method. Study was conducted at the outpatient department Govt. Rajaji Hospital, Madurai during the period 1st January to 31st October 2011.

FREQUENCY OF THE FINGERPRINT PATTERNS

In Present study the Ulnar loop was the most frequently observed pattern followed by Plain Whorl, in the total subject population in all ten digits

(Table 1-11). The least frequently observed pattern in the total population were simple arches, twinned loops, tented arches, radial loops, accidental types and Exceptional arches both in Male and Female.

Igbigbi P.S., Msamati B.C (2002) reported in a study on dermatoglyphics on indigenous black Zimbabweans, they found that ulnar loops were the most predominant digital pattern type in both sexes, followed by whorls in males and arches in females. [27]

Similar findings were noticed in the present study except arches in Females as stated in the above study. In contrast to this it is found in the present study that the frequency of arches is more in Males.

Gangadhar. M.R, Rajashekara Reddy. K (1983) reported in a study that the basic finger pattern type loops (57.11%) were common followed by whorls (27.89%) and arches (15.00%) in the general population with significant sex difference and insignificant bilateral difference. [29]

Almost similar findings are observed except for arches. Whereas in the present study central pocket loops replaces arches in comparison with above said study. The sex difference in the present study is with Ulnar loop being more in Females and whorls being more in Males.

Purkait R, (2003) observed in his comparative study on frequency of fingerprint patterns and variation in the ten digit classification on males (454 samples – 227 from each tribe) of Mundas and Lodhas, a tribal group of Midnapur district in West Bengal where Mundas exhibit higher frequency of whorl and loop patterns while loops are more frequent among Lodhas. [29]

These findings are almost in consistent with the present study findings, loops followed by whorls.

The findings in the above study are in agreement with the present study. In the present study the predominant fingerprint pattern is noticed as Ulnar loop among the total population (both Males and Females) studied. Among 5000 digits studied the Ulnar loop frequency found to be 2561 . The sex difference in frequency of ulnar loop is noticed in the present study also (more in Females than in Males).

Arabind Basu (1976) reported distributional trend of the three principal pattern types having high frequency of loops, moderate whorls and low arches.[39]

In comparison with above study, our study reveals same findings except for arches i.e., central pocket loops replace arches.

After reviewing our observation and other studies results it is felt that uniqueness of fingerprint for an individual exist, but region wise variation in fingerprint pattern and sexual dimorphism is noticed.

RIDGE COUNTS IN MALE AND FEMALE

The Mean ridge count in Male was 12.4 and in Female was 12 in the present study. As ulnar loop was predominant fingerprint pattern both in Male and Female ridge count calculated from it was highest and least ridge count was from Radial loop.

The observations in the present study compared and discussed with the other studies are as follows:

Reddy (1975) reported the mean ridge count for males as 13.41 and that of female as 12.04 [30]

In comparison with this study our findings differ for Males but almost same for Females.

A study was done on males and females of American Negroes and Caucasian American by Plato et al (1975). He found the mean ridge count in Male is more than Female. [31]

In the present study also the mean ridge count being more in Males than in Females.

Dr. Sudesh Gungadin (2007) showed that a mean ridge count of 13 ridges are more likely to be males and 14 ridges are likely to be females.

These findings are not in agreement with our findings i.e. Males 12.4 and in Females 12.

Vinod C.Nayak (2010) report that significant gender differences occur in the finger ride count of 12 ridges more likely to be of males and more than 13 ridges is more likely to be of female origin in Chinese subjects. In Malaysian male 11 ridges or less and in female more than 13 ridges are observed. [37]

These findings differ from the results in the present study i.e. in Males being 12.4 and in Females being 12.

Jantz RL, (1975) studied sex and race difference in finger ridge count. He noticed in the parsis of Indian Males showed significant higher average correlations than females. 23

In the present study almost similar findings were noticed, Males higher than Females.

SUMMARY

Although the uniqueness of fingerprint pattern for an individual is well established earlier, only the study of fingerprint pattern in relation to frequency, ridges and sex distribution in various regions carried out until this time.

In view of this, the present study was taken up to know:

- To determine the predominant fingerprint pattern in and around Madurai.
- To determine the possibility of gender distribution in ridge count.

250 Males and 250 Females subjects were studied in the out patients department of Govt. Rajaji Hospital, Madurai during the period of 1st January to 31st October 2011. Glass slab inking roller method was used to obtain fingerprint.

The predominant pattern among both male and female is Ulnar loop (48.30%) in Male and (54.10%) in Female respectively . Followed by Plain Whorl (30.00%) in Male and (26.50%) in Female respectively. Least noted pattern among both Male (0.60%) and Female (0.40%) is Exceptional Arch.

The present study revealed the ridge count of ulnar loop is highest and radial loop is least. Mean ridge count in Male is 12.4 and in Female is 12. The ridge count in male is slightly more than in females.

CONCLUSION

The following conclusions were drawn based on the study of finger prints:

1. Fingerprints are unique for each person and can be used for positive identification.

2. Fingerprints do not show sexual dimorphism.

3. The most frequent pattern among population of Madurai and neighbouring districts is Ulnar loop in the total population as well as sex distribution.

4.The mean ridge count in Males was 12.4 and in Females was 12. The ridge count in males is slightly more than in females.

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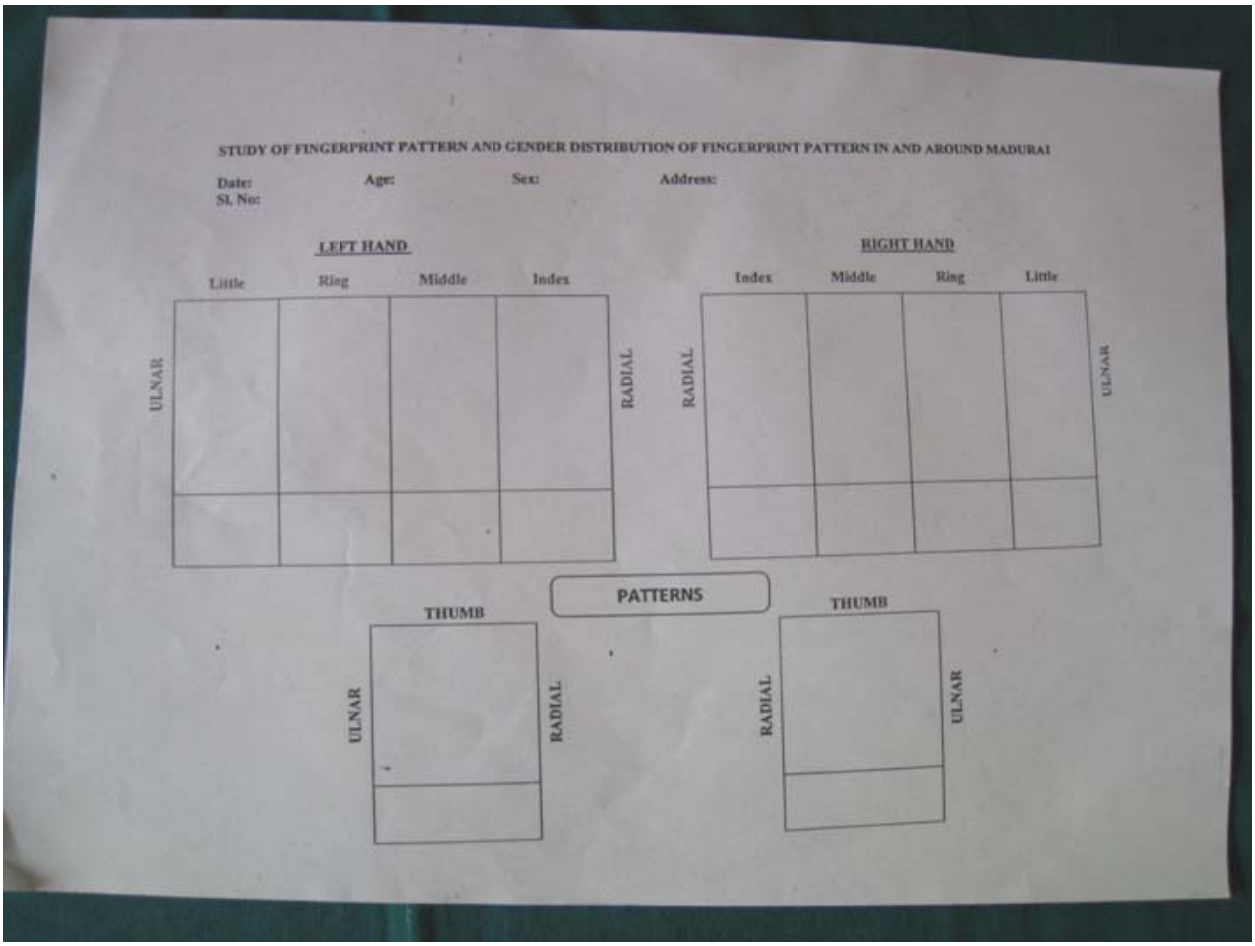


STUDY OF FINGERPRINT PATTERN AND GENDER DISTRIBUTION OF FINGERPRINT PATTERN IN AND AROUND MADURAI

Date: Age: Sex: Address:
Sl. No:

LEFT HAND

Little Ring Middle Index

ULNAR RADIAL

RIGHT HAND

Index Middle Ring Little

RADIAL ULNAR

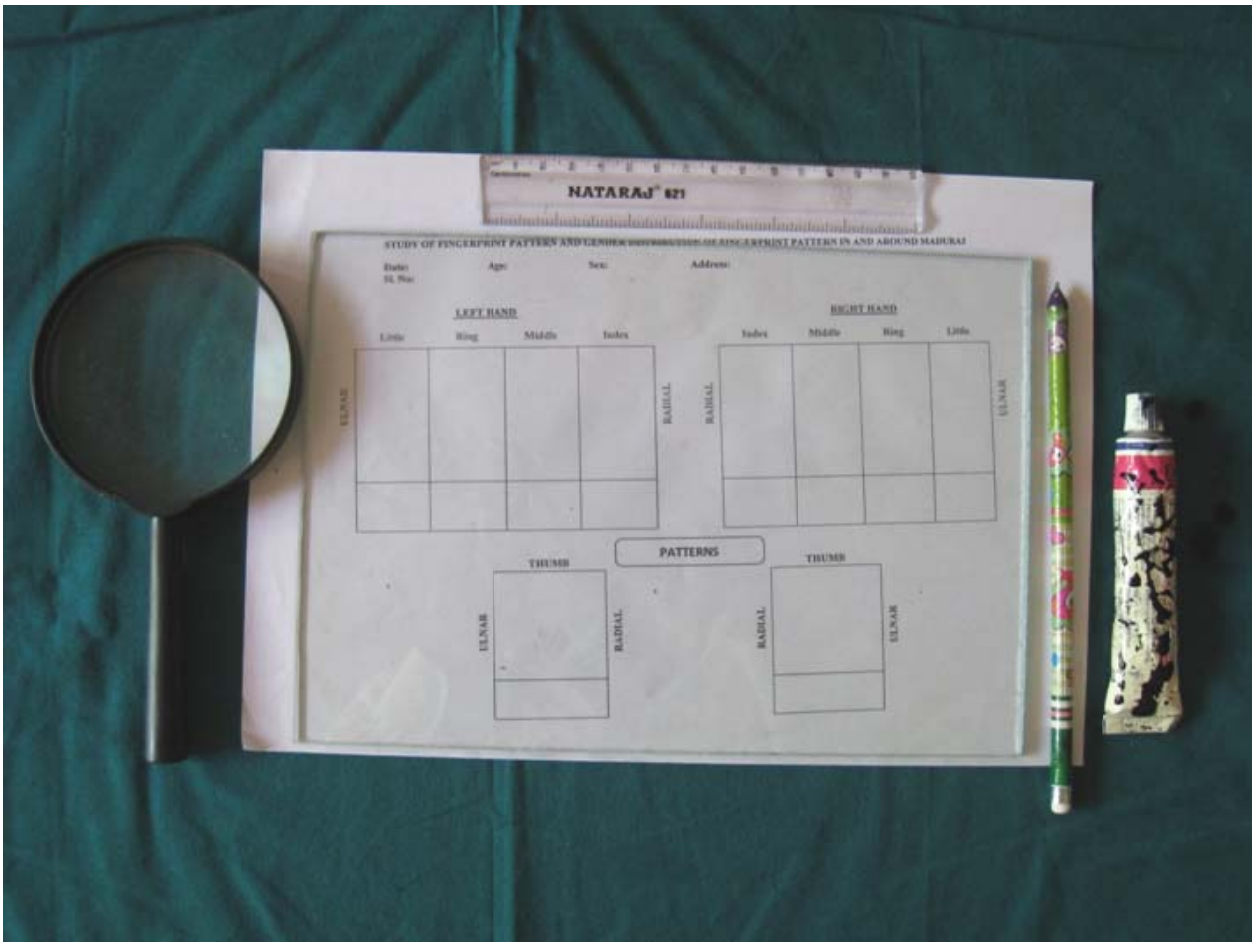
PATTERNS

THUMB

ULNAR RADIAL

THUMB

RADIAL ULNAR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STUDY OF FINGERPRINT PATTERN AND GENDER
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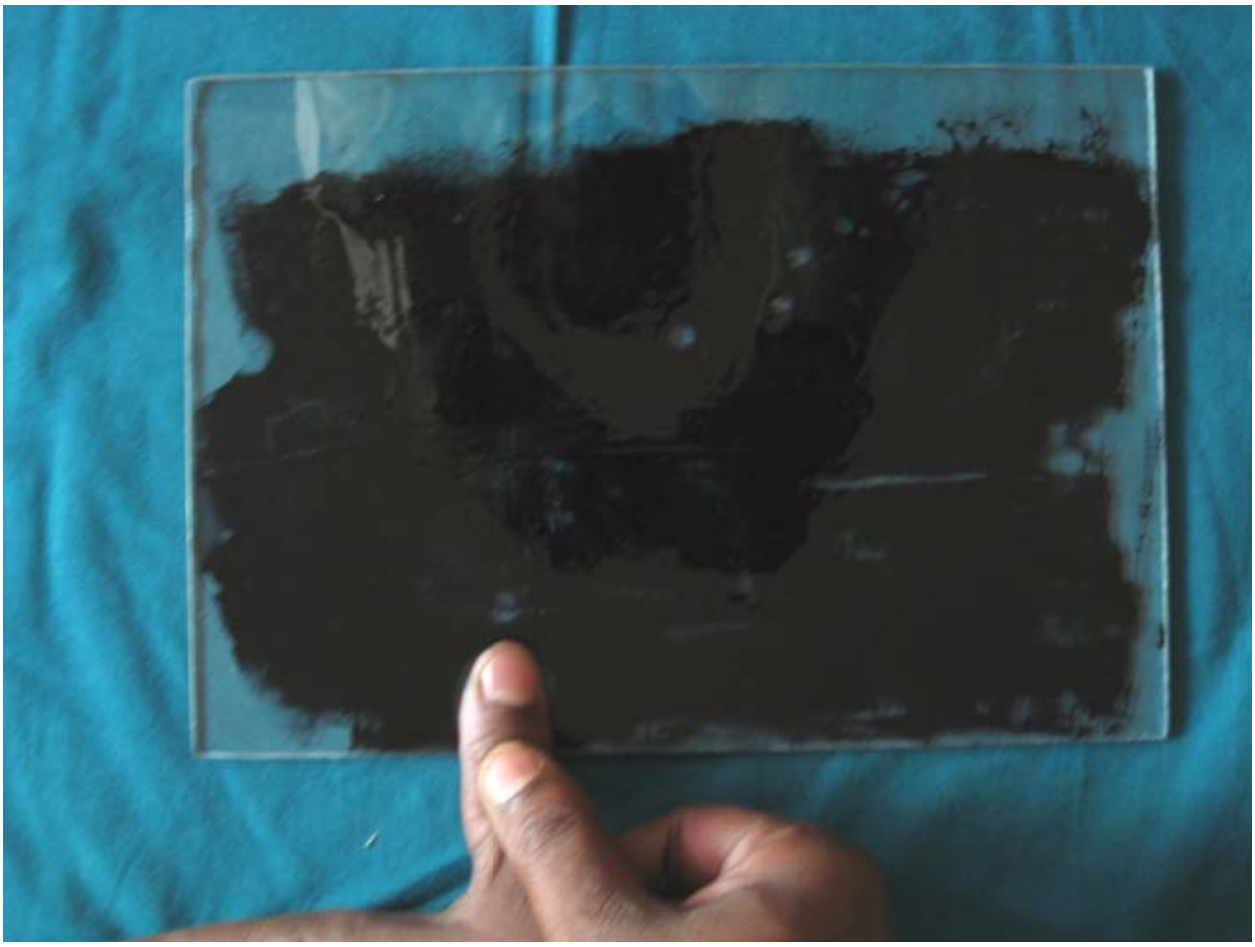
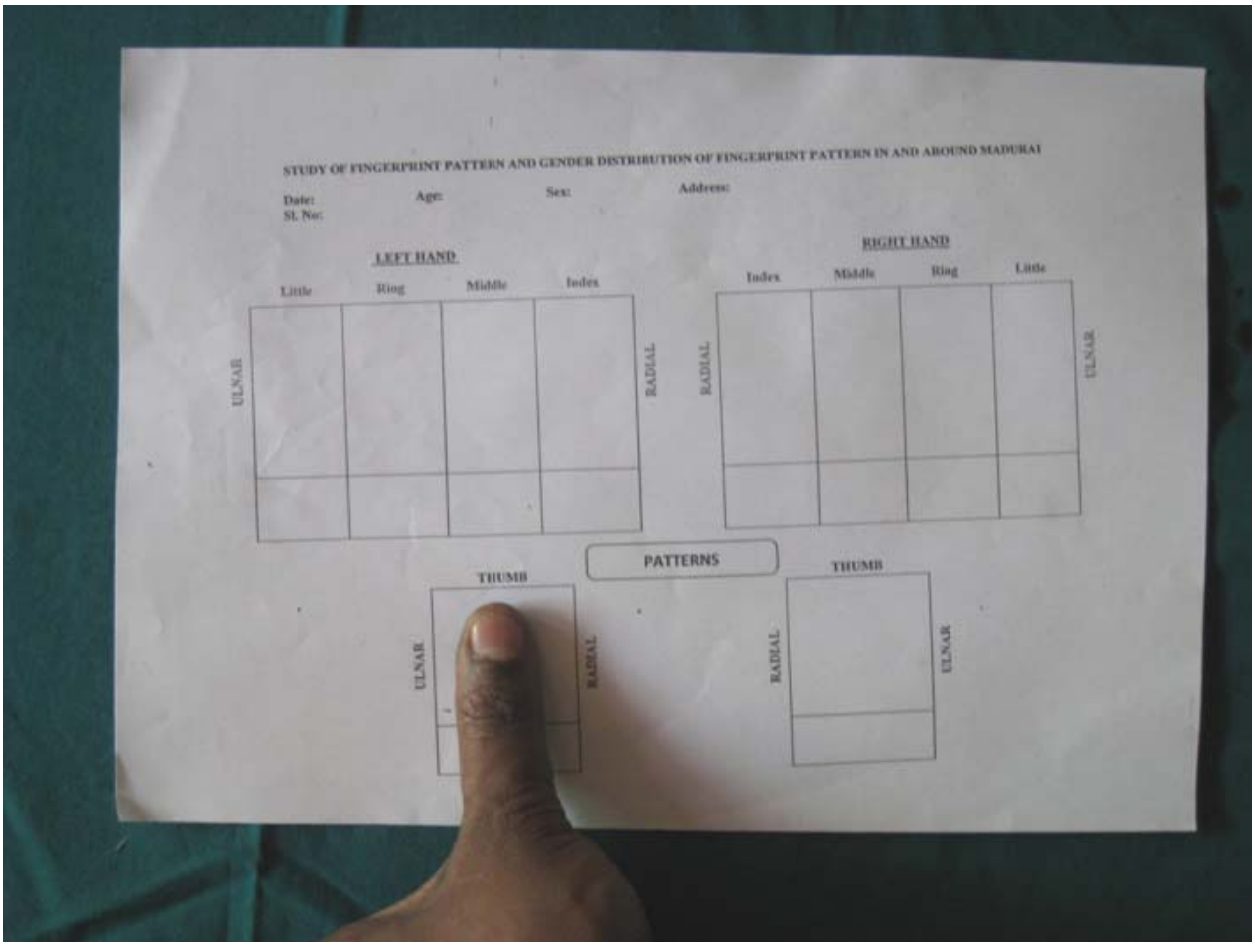
PATTERNS
THUMB




STUDY OF FINGERPRINT PATTERN AND GENDER DISTRIBUTION OF FINGERPRINT PATTERN IN AND AROUND MADURAI
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Sex:
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ULNAR
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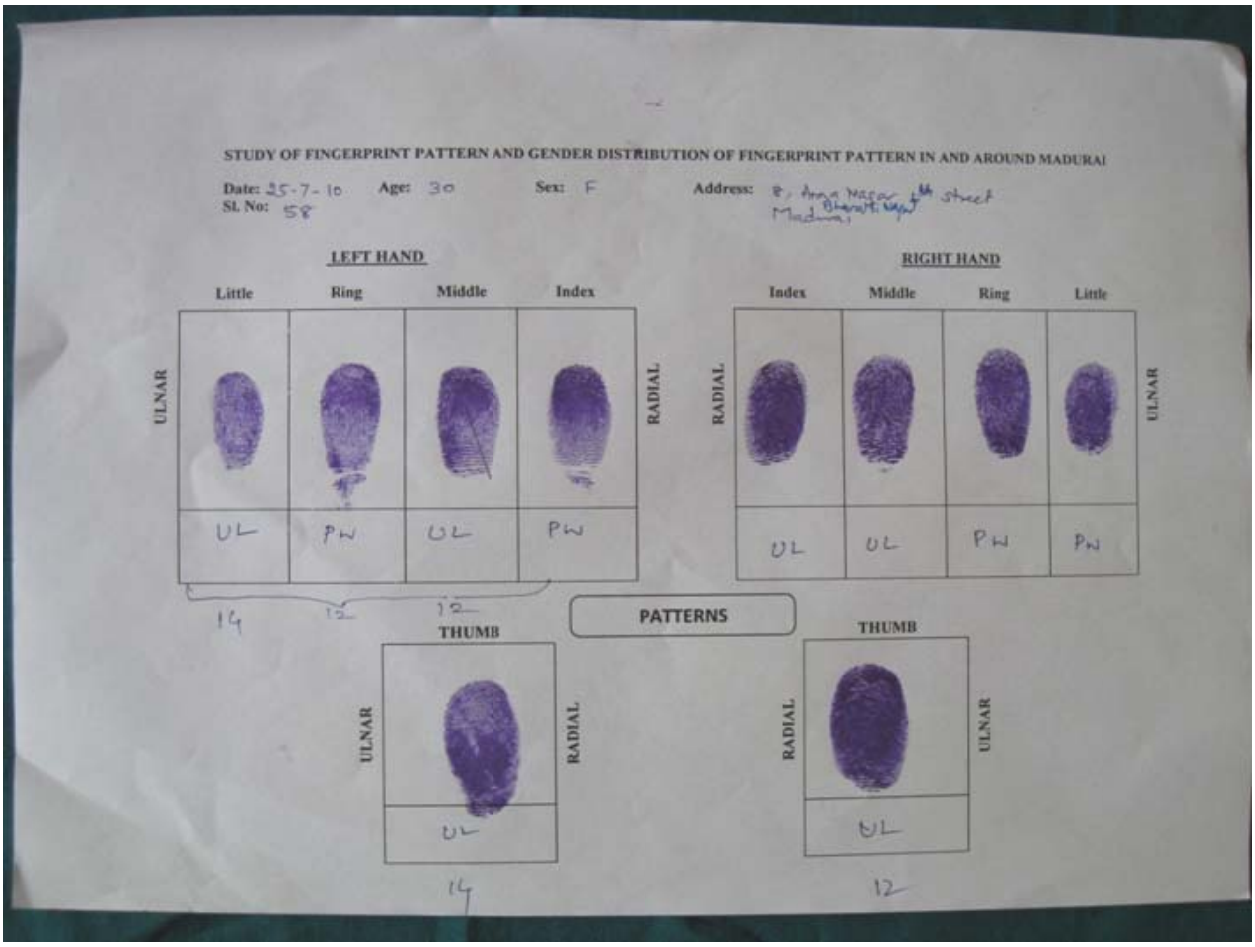
RADIAL
ULNAR



STUDY OF FINGERPRINT PATTERN AND GENDER DISTRIBUTION OF FINGERPRINT PATTERN IN AND AROUND MADURAI

Date: 25-7-10 Age: 30 Sex: F Address: 8, Anna Nagar 4th street Madurai

Sl. No: 58

LEFT HAND

Little Ring Middle Index

ULNAR RADIAL

UL PW UL PW

14 12

RIGHT HAND

Index Middle Ring Little

RADIAL ULNAR

UL UL PW PW

PATTERNS

THUMB

ULNAR RADIAL

UL

14

THUMB

RADIAL ULNAR

UL

12


LEFT HAND
Little
Ring
Middle
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ULNAR
RADIAL
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PW

MASTER CHART

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
1	19	M	UL	PW	PW	PW	PW	UL	PW	PW	PW	PW	15	0	0	0	0	15	0	0	0	0
2	18	M	UL	PW	UL	SA	UL	UL	PW	UL	UL	UL	12	0	13	0	16	13	0	15	16	16
3	17	M	UL	PW	UL	UL	PW	UL	PW	UL	UL	PW	10	0	13	15	0	13	0	12	22	0
4	21	M	UL	AT	AT	AT	UL	UL	SA	UL	AT	UL	11	0	0	0	11	7	0	6	0	11
5	21	M	UL	PW	PW	PW	UL	PW	PW	PW	PW	PW	16	0	0	0	18	0	0	0	0	0
6	18	M	UL	UL	UL	EA	TL	UL	PW	EA	EA	CPL	18	18	12	0	0	17	0	0	0	0
7	18	M	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
8	19	M	UL	UL	UL	UL	UL	UL	UL	UL	PW	PW	12	13	13	13	14	14	11	12	0	0
9	19	M	UL	PW	PW	PW	PW	PW	PW	PW	PW	PW	14	0	0	0	0	0	0	0	0	0
10	19	M	PW	UL	UL	UL	UL	UL	CPL	UL	UL	UL	0	16	19	17	16	17	0	17	19	18
11	18	M	UL	PW	PW	PW	PW	UL	PW	UL	PW	PW	20	0	0	0	0	19	0	19	0	0
12	18	M	CPL	CPL	UL	UL	EA	PW	CPL	UL	EA	UL	0	0	14	10	0	0	0	13	0	14
13	18	M	PW	PW	UL	PW	PW	PW	PW	UL	UL	UL	0	0	21	0	0	0	0	18	17	20
14	18	M	UL	PW	UL	RL	PW	UL	PW	UL	UL	PW	16	0	3	0	0	12	0	16	20	0
15	18	M	UL	UL	UL	EA	UL	UL	UL	UL	UL	UL	8	11	8	0	16	10	9	12	14	18
16	46	M	UL	UL	UL	UL	TL	UL	UL	UL	UL	UL	17	15	15	11	0	17	19	15	13	17
17	27	M	UL	PW	UL	RL	UL	UL	PW	UL	PW	UL	15	0	15	13	18	17	0	15	0	18
18	50	M	CPL	PW	UL	UL	TL	PW	TL	TL	TL	PW	0	0	21	20	0	0	0	0	0	0
19	16	M	CPL	PW	PW	UL	UL	PW	PW	UL	UL	UL	0	0	0	13	20	0	0	14	13	24
20	37	M	UL	UL	UL	PW	UL	UL	UL	UL	CPL	UL	13	18	16	0	18	13	17	17	0	18

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
21	30	M	UL	CPL	UL	PW	TL	UL	UL	UL	UL	UL	15	0	17	0	0	15	17	18	18	28
22	18	M	CPL	PW	PW	PW	CPL	CPL	PW	PW	PW	UL	0	0	0	0	0	0	0	0	0	19
23	15	M	PW	PW	CPL	PW	PW	PW	PW	UL	PW	PW	0	0	0	0	0	0	0	13	0	0
24	13	M	CPL	PW	PW	PW	PW	CPL	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
25	14	M	UL	UL	UL	AT	UL	CPL	UL	UL	UL	UL	15	17	17	0	20	14	17	13	15	19
26	14	M	CPL	UL	SA	SA	UL	UL	PW	SA	RL	PW	0	11	0	0	20	14	0	0	9	0
27	14	M	UL	PW	UL	PW	PW	UL	PW	CPL	PW	PW	19	0	14	0	0	17	0	0	0	0
28	15	M	UL	PW	UL	UL	UL	UL	PW	UL	PW	UL	11	0	16	13	12	11	0	17	1	10
29	15	M	UL	CPL	UL	CPL	UL	UL	UL	CPL	UL	CPL	16	0	12	0	14	13	17	0	13	0
30	19	M	PW	PW	UL	CPL	CPL	PW	PW	CPL	PW	TL	0	0	14	0	0	0	0	0	0	0
31	20	M	PW	PW	PW	PW	PW	UL	PW	TL	TL	PW	0	0	0	0	0	14	0	0	0	0
32	20	M	PW	PW	CPL	CPL	CPL	PW	PW	UL	PW	PW	0	0	0	0	0	0	0	11	0	0
33	20	M	UL	PW	UL	PW	TL	UL	PW	UL	PW	TL	12	0	15	0	0	13	0	16	0	0
34	19	M	UL	PW	UL	UL	PW	UL	PW	RL	CPL	TL	12	0	15	0	0	13	0	16	0	0
35	19	M	UL	PW	PW	UL	UL	UL	UL	UL	UL	UL	18	0	0	12	19	16	20	17	17	21
36	20	M	PW	PW	PW	PW	UL	PW	PW	PW	PW	PW	0	0	0	0	21	0	0	0	0	0
37	20	M	UL	PW	UL	UL	UL	UL	PW	UL	UL	UL	16	0	16	14	19	16	0	12	9	4
38	19	M	UL	PW	PW	PW	PW	UL	PW	PW	PW	PW	15	0	0	0	0	19	0	0	0	0
39	20	M	UL	CPL	UL	UL	UL	UL	PW	UL	PW	PW	22	0	21	19	23	19	0	18	0	0
40	19	M	UL	PW	PW	PW	UL	CPL	PW	RL	PW	UL	11	0	0	0	14	0	0	13	0	17
41	15	M	UL	PW	TL	PW	UL	PW	PW	UL	UL	PW	15	0	19	0	21	0	0	16	16	0
42	46	M	PW	PW	UL	UL	SA	PW	PW	UL	UL	CPL	0	0	19	17	0	0	0	19	17	0
43	14	M	PW	PW	PW	PW	PW	PW	PW	TL	PW	PW	0	0	0	0	0	0	0	0	0	0

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
44	37	M	PW	PW	AT	PW	TL	PW	PW	PW	PW	TL	0	0	0	0	0	0	0	0	0	0
45	35	M	UL	AT	PW	PW	PW	UL	PW	PW	PW	PW	15	0	0	0	0	17	0	0	0	0
46	18	M	UL	PW	UL	CPL	UL	UL	CPL	UL	PW	UL	14	0	9	0	15	11	0	15	0	11
47	18	M	PW	PW	PW	PW	UL	CPL	PW	UL	AT	UL	0	0	0	0	19	0	0	17	0	19
48	18	M	UL	PW	PW	PW	UL	UL	PW	PW	RL	PW	16	0	0	0	19	18	0	0	0	0
49	18	M	UL	UL	UL	TL	PW	UL	UL	UL	UL	TL	13	9	12	0	0	11	11	11	14	0
50	18	M	UL	UL	UL	RL	UL	UL	UL	UL	RL	PW	13	18	12	7	19	12	16	15	4	0
51	19	M	UL	TL	UL	UL	UL	PW	PW	TL	TL	PW	17	0	22	19	19	0	0	0	0	0
52	20	M	AT	UL	UL	RL	UL	PW	UL	UL	UL	PW	0	7	8	4	18	0	7	8	9	0
53	20	M	AT	AT	UL	AT	TL	UL	PW	UL	RL	PW	0	0	11	8	0	13	0	12	14	0
54	15	M	UL	PW	TL	PW	UL	PW	PW	UL	UL	PW	15	0	19	0	21	0	0	16	16	0
55	46	M	PW	PW	UL	UL	SA	PW	PW	UL	UL	CPL	0	0	19	17	0	0	0	19	17	0
56	15	M	UL	PW	CPL	PW	UL	PW	PW	PW	PW	PW	18	0	0	0	15	0	0	0	0	0
57	37	M	PW	PW	AT	PW	TL	PW	PW	PW	PW	TL	0	0	0	0	0	0	0	0	0	0
58	35	M	UL	AT	PW	PW	PW	UL	PW	PW	PW	PW	15	0	0	0	0	17	0	0	0	0
59	14	M	PW	PW	UL	UL	PW	CPL	PW	UL	TL	UL	0	0	14	10	0	1	0	11	11	20
60	14	M	UL	PW	PW	PW	TL	UL	PW	PW	PW	TL	19	0	0	0	0	18	0	0	0	0
61	14	M	UL	PW	UL	PW	UL	UL	PW	UL	RL	UL	18	0	18	0	22	18	0	13	19	20
62	14	M	UL	PW	TL	SA	TL	PW	PW	UL	SA	TL	19	0	0	0	0	0	0	8	0	0
63	14	M	UL	PW	PW	RL	PW	UL	PW	AT	PW	PW	18	0	0	22	0	17	0	0	0	0
64	15	M	UL	PW	UL	PW	PW	UL	UL	UL	PW	PW	19	0	19	0	0	19	21	17	0	0
65	20	M	UL	PW	UL	UL	UL	UL	AT	UL	PW	PW	16	0	19	18	18	15	0	17	0	0
66	22	M	UL	PW	UL	RL	PW	UL	UL	UL	UL	PW	16	0	15	14	0	15	15	15	19	0

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
67	23	M	UL	UL	UL	RL	UL	UL	UL	UL	UL	UL	15	12	17	10	18	18	15	20	19	22
68	17	M	UL	PW	UL	RL	PW	UL	PW	PW	PW	UL	16	0	12	16	0	16	0	0	0	23
69	18	M	UL	PW	PW	PW	UL	UL	PW	UL	UL	UL	17	0	0	0	19	17	0	15	13	19
70	18	M	PW	PW	CPL	PW	TL	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
71	18	M	UL	TL	TL	TL	TL	UL	PW	TL	TL	UL	17	0	0	0	0	19	0	0	0	24
72	18	M	UL	PW	UL	UL	PW	UL	PW	UL	PW	PW	12	0	19	16	0	13	0	20	0	0
73	18	M	UL	UL	UL	SA	SA	UL	PW	UL	AT	UL	22	20	17	0	0	20	0	19	0	15
74	20	M	UL	PW	PW	PW	PW	PW	PW	PW	PW	UL	14	0	0	0	0	0	0	0	0	16
75	18	M	PW	EA	UL	UL	UL	PW	PW	PW	UL	UL	0	0	22	20	25	0	0	0	22	23
76	22	M	UL	UL	UL	UL	UL	UL	UL	TL	UL	UL	11	15	12	10	11	13	14	0	14	20
77	18	M	UL	PW	UL	UL	UL	UL	PW	UL	UL	TL	20	0	20	20	23	18	0	18	18	0
78	21	M	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	10	12	17	13	18	12	15	16	15	17
79	18	M	UL	UL	UL	AT	TL	UL	UL	UL	TL	TL	21	16	16	0	0	22	18	17	0	0
80	18	M	UL	UL	UL	AT	UL	UL	UL	UL	AT	UL	17	16	15	0	21	19	17	5	0	29
81	19	M	UL	UL	SA	SA	UL	SA	SA	UL	SA	RL	7	6	0	0	15	0	0	5	0	14
82	19	M	UL	UL	UL	UL	UL	PW	PW	UL	RL	PW	16	16	19	16	16	0	0	19	17	0
83	20	M	UL	PW	UL	UL	UL	PW	PW	UL	PW	UL	16	0	18	16	21	0	0	18	0	20
84	21	M	UL	PW	UL	UL	PW	UL	PW	PW	UL	PW	18	0	14	14	0	19	0	0	14	0
85	18	M	CPL	PW	UL	PW	PW	UL	UL	UL	PW	PW	16	0	16	0	0	15	17	13	0	0
86	18	M	UL	UL	AT	AT	UL	UL	UL	UL	AT	UL	13	12	0	0	15	13	15	10	0	25
87	18	M	PW	PW	UL	RL	TL	PW	PW	UL	PW	TL	0	0	21	21	0	0	0	18	0	0
88	19	M	UL	UL	UL	AT	UL	UL	PW	UL	SA	UL	13	12	0	0	9	9	0	9	0	14
89	21	M	UL	UL	UL	RL	UL	UL	UL	UL	UL	PW	18	14	13	11	20	16	12	15	13	0

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
90	19	M	UL	PW	UL	UL	PW	UL	PW	UL	UL	PW	21	0	15	20	0	18	0	17	17	0
91	19	M	UL	UL	UL	UL	UL	UL	UL	TL	PW	PW	15	15	17	13	18	11	14	13	0	0
92	18	M	UL	PW	UL	CPL	UL	UL	CPL	UL	PW	UL	16	0	11	0	16	12	0	17	0	12
93	19	M	UL	PW	UL	UL	TL	UL	PW	UL	RL	TL	16	0	13	14	0	11	0	10	15	0
94	18	M	UL	PW	UL	UL	PW	UL	PW	UL	EA	PW	12	0	15	18	0	11	0	16	20	0
95	18	M	UL	PW	TL	TL	UL	UL	PW	X	PW	PW	20	0	0	0	12	21	0	18	0	0
96	43	M	UL	UL	UL	AT	UL	UL	SA	AT	RL	UL	14	8	9	0	22	11	0	0	8	15
97	14	M	UL	PW	PW	PW	TL	UL	PW	UL	PW	PW	21	0	0	0	0	17	0	20	0	0
98	14	M	UL	PW	UL	UL	UL	UL	PW	UL	UL	UL	15	0	16	21	23	13	0	13	16	23
99	41	M	EA	UL	SA	SA	EA	UL	UL	UL	PW	EA	0	21	0	0	0	15	19	17	0	0
100	55	M	UL	UL	UL	UL	UL	UL	CPL	PW	PW	PW	17	20	19	19	20	18	0	0	0	0
101	37	M	SA	EA	SA	SA	UL	EA	EA	SA	EA	UL	0	0	0	0	22	0	0	0	0	19
102	24	M	UL	UL	UL	EA	UL	UL	UL	EA	TL	PW	19	20	15	0	16	17	19	0	0	0
103	40	M	UL	PW	UL	UL	TL	UL	PW	TL	AT	TL	19	0	11	15	0	17	0	0	0	0
104	40	M	UL	UL	UL	UL	TL	UL	UL	UL	PW	PW	19	13	12	18	0	12	11	13	0	0
105	18	M	UL	UL	PW	UL	UL	UL	UL	UL	UL	UL	11	17	0	16	16	13	18	12	16	23
106	41	M	UL	PW	UL	PW	PW	UL	PW	UL	PW	PW	18	0	16	0	0	16	0	13	0	0
107	53	M	PW	PW	PW	PW	UL	PW	PW	UL	PW	UL	0	0	0	0	14	0	0	17	0	15
108	33	M	CPL	PW	TL	TL	TL	PW	PW	TL	TL	PW	0	0	0	0	0	0	0	0	0	0
109	35	M	UL	SA	UL	UL	UL	UL	UL	UL	UL	UL	11	13	14	11	15	8	12	17	14	18
110	40	M	PW	CPL	UL	X	TL	UL	PW	UL	UL	PW	0	0	12	0	0	16	0	5	17	0
111	33	M	UL	CPL	TL	UL	UL	X	PW	TL	PW	UL	12	0	0	9	17	0	0	0	0	21
112	43	M	TL	PW	UL	UL	UL	UL	PW	UL	PW	UL	0	0	15	16	13	12	0	15	0	21

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
113	41	M	UL	CPL	UL	UL	UL	UL	PW	UL	RL	UL	15	0	14	10	22	16	0	14	15	19
114	13	M	UL	CPL	UL	SA	PW	UL	UL	UL	SA	PW	15	0	9	0	0	9	5	8	0	0
115	14	M	UL	CPL	UL	UL	SA	UL	CPL	UL	SA	UL	16	0	12	11	0	14	0	10	0	8
116	15	M	UL	PW	SA	AT	UL	UL	UL	AT	UL	UL	7	0	0	0	9	9	6	0	6	9
117	15	M	X	PW	PW	PW	TL	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
118	15	M	UL	PW	UL	UL	TL	UL	PW	UL	PW	PW	20	0	19	19	0	17	0	16	0	0
119	14	M	UL	UL	SA	SA	SA	CPL	CPL	SA	SA	UL	9	13	0	0	0	0	0	0	0	13
120	45	M	UL	UL	UL	SA	UL	UL	UL	UL	EA	UL	13	13	14	0	16	14	13	16	0	14
121	43	M	UL	PW	UL	UL	PW	UL	CPL	UL	UL	UL	18	0	17	22	0	14	0	17	17	23
122	41	M	UL	PW	TL	TL	PW	UL	PW	TL	PW	PW	24	0	0	0	0	25	0	0	0	0
123	34	M	UL	UL	SA	SA	SA	UL	EA	EA	SA	SA	20	10	0	0	0	18	0	0	0	0
124	42	M	UL	UL	UL	PW	UL	CPL	CPL	PW	RL	UL	20	24	20	0	20	0	0	0	23	21
125	32	M	UL	UL	UL	RL	UL	UL	UL	UL	AT	UL	18	15	15	9	17	16	13	14	0	16
126	35	M	CPL	PW	TL	PW	TL	UL	PW	TL	TL	CPL	0	0	0	0	0	19	0	0	0	0
127	32	M	PW	PW	UL	UL	UL	UL	CPL	UL	UL	SA	0	0	14	18	16	12	0	14	17	0
128	41	M	UL	PW	UL	PW	UL	UL	PW	PW	PW	PW	20	0	21	0	13	21	0	0	0	0
129	38	M	CPL	PW	PW	RL	TL	CPL	PW	TL	TL	PW	0	0	0	16	0	0	0	0	0	0
130	21	M	UL	UL	UL	UL	UL	UL	PW	PW	UL	UL	13	17	17	14	18	13	0	0	15	17
131	35	M	UL	PW	PW	PW	SA	UL	PW	PW	PW	CPL	15	0	0	0	0	13	0	0	0	0
132	30	M	TL	PW	TL	PW	UL	PW	EA	UL	UL	TL	0	0	0	0	21	0	0	20	19	0
133	35	M	UL	UL	UL	RL	UL	UL	SA	UL	PW	UL	17	16	14	13	21	16	20	11	0	24
134	19	M	UL	UL	UL	UL	UL	UL	UL	UL	RL	UL	14	19	18	17	14	16	21	19	14	17
135	19	M	UL	PW	CPL	EA	TL	UL	PW	UL	EA	PW	16	0	0	0	0	14	0	16	0	0

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
136	19	M	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	14	15	15	13	15	15	14	17	13	20
137	18	M	EA	EA	UL	UL	UL	EA	AT	UL	UL	UL	0	0	13	14	17	0	0	13	17	20
138	19	M	UL	PW	PW	UL	CPL	UL	PW	UL	PW	PW	20	0	0	20	0	20	0	20	0	0
139	19	M	PW	PW	UL	UL	UL	PW	PW	UL	UL	TL	0	0	20	15	22	0	0	19	19	0
140	19	M	UL	UL	UL	EA	UL	PW	PW	UL	UL	UL	17	17	15	0	18	0	0	16	15	22
141	19	M	AT	UL	UL	AT	EA	EA	UL	UL	EA	EA	0	13	14	0	0	0	11	13	0	0
142	19	M	UL	UL	EA	UL	UL	UL	EA	UL	UL	UL	14	13	0	15	19	13	0	13	16	17
143	19	M	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	16	19	12	15	16	15	17	13	12	12
144	18	M	UL	UL	UL	TL	TL	UL	PW	UL	PW	TL	15	21	17	0	0	0	20	19	0	17
145	18	M	UL	UL	SA	EA	UL	UL	PW	EA	AT	UL	15	17	0	0	13	15	0	0	0	19
146	19	M	UL	UL	TL	TL	UL	EA	UL	UL	CPL	TL	15	26	0	0	21	20	22	17	0	0
147	18	M	UL	UL	UL	PW	TL	PW	PW	UL	PW	TL	19	19	19	0	0	0	0	20	0	0
148	18	M	PW	UL	UL	PW	UL	UL	PW	UL	CPL	PW	20	21	0	0	20	20	0	20	0	0
149	21	M	UL	UL	UL	PW	PW	UL	UL	UL	PW	PW	13	15	16	0	0	17	21	19	0	0
150	18	M	UL	PW	UL	PW	TL	UL	PW	EA	PW	TL	19	0	19	0	0	20	0	0	0	0
151	29	M	PW	PW	PW	UL	UL	PW	PW	UL	PW	UL	0	0	0	19	23	0	0	20	0	22
152	40	M	UL	PW	SA	SA	PW	UL	PW	SA	SA	PW	14	0	0	0	0	14	0	0	0	0
153	30	M	UL	SA	UL	UL	SA	UL	UL	SA	UL	SA	10	0	10	11	0	12	12	0	14	0
154	20	M	PW	PW	UL	X	SA	PW	PW	UL	PW	UL	0	0	10	0	0	0	0	9	0	21
155	20	M	UL	PW	AT	PW	UL	UL	PW	X	PW	PW	16	0	0	0	10	17	0	0	0	0
156	24	M	UL	PW	UL	PW	TL	UL	PW	UL	PW	PW	18	0	20	0	0	21	0	17	0	0
157	19	M	UL	PW	UL	TL	UL	UL	PW	UL	UL	UL	13	0	19	0	16	10	0	16	17	16
158	20	M	UL	PW	UL	PW	UL	CPL	PW	UL	PW	PW	19	0	14	0	11	0	0	11	0	0

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
159	20	M	UL	UL	UL	UL	UL	UL	PW	UL	AT	UL	13	19	13	4	17	15	0	7	0	19
160	30	M	UL	UL	UL	SA	UL	UL	PW	UL	SA	UL	11	15	7	0	13	12	0	8	0	18
161	22	M	UL	UL	UL	RL	UL	UL	UL	UL	UL	TL	17	18	12	9	19	14	11	14	9	0
162	47	M	UL	SA	AT	AT	UL	EA	EA	SA	SA	UL	15	0	0	0	16	0	0	0	0	15
163	39	M	UL	TL	AT	TL	UL	UL	UL	UL	TL	UL	17	0	0	0	19	17	18	19	0	17
164	21	M	UL	UL	UL	UL	TL	RL	UL	PW	UL	UL	20	23	20	13	0	9	17	0	24	20
165	19	M	TL	PW	TL	RL	UL	UL	UL	UL	PW	UL	0	0	0	16	22	17	22	16	0	23
166	28	M	PW	PW	PW	PW	AT	PW	PW	PW	PW	UL	0	0	0	0	21	0	0	0	0	20
167	18	M	X	PW	SA	PW	UL	PW	PW	UL	TL	UL	0	0	21	0	21	0	0	19	0	24
168	20	M	UL	UL	PW	PW	UL	UL	PW	PW	PW	PW	15	19	0	0	19	19	0	0	0	0
169	21	M	UL	PW	UL	CPL	UL	UL	PW	RL	RL	PW	14	0	19	0	15	16	0	16	18	0
170	18	M	UL	UL	UL	X	SA	UL	PW	UL	UL	UL	18	18	15	0	0	15	0	16	8	16
171	19	M	PW	PW	UL	UL	PW	PW	UL	UL	SA	PW	0	0	14	6	0	0	17	12	0	0
172	18	M	UL	PW	UL	PW	UL	UL	TL	PW	PW	UL	17	0	17	0	21	17	19	0	0	19
173	21	M	UL	UL	UL	UL	UL	UL	PW	UL	PW	UL	14	14	12	12	13	13	0	11	0	12
174	19	M	TL	PW	TL	TL	PW	PW	PW	UL	TL	UL	0	0	0	0	0	0	0	16	0	20
175	18	M	PW	PW	PW	PW	TL	PW	PW	UL	PW	TL	0	0	0	0	0	0	0	14	0	0
176	18	M	UL	PW	PW	PW	PW	PW	PW	PW	PW	PW	18	0	0	0	0	0	0	0	0	0
177	20	M	UL	PW	UL	SA	TL	UL	PW	UL	SA	TL	20	0	16	0	0	24	0	14	0	0
178	20	M	UL	UL	UL	UL	TL	UL	UL	UL	UL	TL	13	9	10	5	0	13	13	8	7	0
179	19	M	UL	UL	AT	UL	TL	UL	UL	UL	UL	TL	19	18	0	11	0	19	21	8	12	0
180	20	M	UL	UL	UL	UL	UL	UL	PW	UL	PW	EA	14	17	14	15	15	15	0	19	0	23
181	18	M	UL	UL	UL	UL	PW	UL	PW	UL	UL	PW	19	22	20	21	0	18	0	17	17	0

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
182	18	M	UL	CPL	UL	UL	UL	UL	CPL	UL	UL	UL	15	0	15	13	11	14	0	13	17	19
183	18	M	CPL	PW	PW	PW	PW	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
184	18	M	PW	PW	TL	UL	TL	UL	PW	TL	X	TL	0	0	0	15	0	19	0	0	0	0
185	18	M	UL	UL	UL	PW	UL	UL	PW	TL	PW	UL	18	23	22	0	18	20	0	0	0	20
186	20	M	UL	PW	UL	UL	UL	UL	PW	UL	UL	UL	17	0	13	12	15	14	0	13	11	17
187	22	M	UL	PW	PW	RL	PW	UL	PW	UL	PW	PW	19	0	0	14	0	19	0	14	0	0
188	22	M	UL	UL	SA	SA	UL	UL	UL	SA	SA	UL	13	14	0	0	15	13	11	0	0	13
189	21	M	UL	PW	UL	RL	TL	UL	UL	UL	RL	UL	21	0	17	20	0	18	11	15	12	26
190	20	M	UL	CPL	UL	UL	UL	UL	PW	UL	UL	UL	14	0	12	12	17	14	0	14	13	15
191	15	M	UL	AT	AT	AT	UL	UL	UL	UL	SA	UL	4	0	0	0	13	7	11	9	0	13
192	16	M	UL	CPL	UL	RL	PW	UL	CPL	UL	SA	PW	0	9	7	0	13	7	0	8	0	0
193	16	M	UL	PW	PW	PW	PW	UL	PW	PW	PW	UL	17	0	0	0	0	14	0	0	0	21
194	16	M	UL	PW	SA	SA	TL	PW	UL	SA	SA	UL	13	0	0	0	0	0	17	0	0	18
195	16	M	UL	UL	UL	UL	UL	CPL	PW	UL	UL	TL	12	15	15	12	16	0	0	15	12	0
196	16	M	UL	PW	UL	PW	UL	PW	PW	UL	SA	SA	19	0	11	0	13	0	0	11	0	0
197	16	M	PW	SA	SA	UL	TL	PW	SA	UL	UL	UL	0	0	0	10	0	0	0	5	13	17
198	15	M	UL	UL	UL	RL	PW	UL	UL	UL	UL	TL	16	14	14	15	0	16	14	16	14	0
199	16	M	UL	UL	UL	RL	UL	UL	UL	UL	RL	UL	13	12	15	5	21	13	14	13	6	22
200	16	M	PW	PW	UL	PW	UL	PW	PW	UL	PW	UL	0	0	16	0	21	0	0	15	0	23
201	20	M	UL	UL	AT	AT	TL	AT	UL	UL	SA	UL	19	19	0	0	0	0	17	12	0	17
202	20	M	UL	CPL	UL	UL	UL	UL	CPL	EA	RL	CPL	17	0	11	10	13	15	0	0	14	0
203	20	M	UL	CPL	UL	UL	PW	UL	PW	UL	PW	PW	20	0	14	18	0	21	0	14	0	0
204	20	M	UL	EA	AT	CPL	AT	UL	EA	UL	UL	SA	14	0	0	16	0	16	0	11	14	0

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
205	20	M	UL	UL	UL	CPL	UL	UL	UL	EA	AT	UL	16	14	14	0	18	16	17	0	0	16
206	21	M	UL	UL	UL	UL	UL	UL	PW	UL	UL	UL	14	16	16	16	18	18	0	17	17	24
207	18	M	UL	CPL	UL	UL	UL	CPL	CPL	UL	PW	TL	15	0	10	15	17	0	0	9	0	0
208	14	M	UL	UL	UL	UL	UL	AT	PW	UL	UL	TL	18	21	12	15	21	16	0	15	15	0
209	14	M	UL	PW	UL	UL	UL	PW	PW	UL	UL	PW	19	0	13	11	13	0	0	15	10	0
210	13	M	UL	UL	UL	UL	PW	UL	UL	UL	RL	PW	11	16	11	11	0	11	14	13	13	0
211	18	M	PW	PW	UL	UL	PW	PW	PW	UL	UL	UL	0	0	17	16	0	0	0	21	17	27
212	18	M	UL	CPL	UL	UL	UL	UL	CPL	UL	UL	PW`	13	17	13	13	12	12	0	10	9	0
213	18	M	UL	UL	UL	SA	SA	UL	UL	UL	UL	TL	18	18	14	0	0	20	19	14	12	0
214	20	M	UL	PW	PW	PW	UL	TL	PW	PW	PW	UL	20	0	0	0	14	0	0	0	0	21
215	18	M	UL	PW	UL	TL	UL	UL	PW	TL	RL	TL	18	0	21	0	24	15	0	0	22	0
216	19	M	UL	PW	EA	CPL	TL	PW	PW	TL	CPL	TL	21	0	24	0	0	0	0	0	0	0
217	19	M	UL	CPL	PW	PW	UL	UL	PW	PW	PW	PW	16	0	0	0	21	17	0	0	0	0
218	20	M	UL	UL	UL	RL	CPL	EA	PW	UL	CPL	UL	8	19	7	15	0	0	0	12	0	15
219	20	M	UL	UL	UL	AT	EA	UL	TL	UL	RL	TL	20	24	20	0	0	18	0	20	24	0
220	20	M	UL	EA	EA	EA	TL	PW	CPL	EA	EA	TL	17	0	0	0	0	0	0	0	0	0
221	17	M	CPL	PW	UL	EA	CPL	UL	UL	SA	PW	SA	0	0	15	0	0	11	17	0	0	8
222	17	M	UL	UL	UL	SA	UL	UL	UL	UL	UL	UL	15	17	14	0	18	14	15	14	14	16
223	18	M	UL	PW	TL	PW	UL	UL	PW	PW	PW	PW	11	0	0	0	14	14	0	0	0	0
224	17	M	UL	CPL	PW	UL	PW	PW	CPL	TL	UL	PW	17	0	0	17	0	0	0	0	18	0
225	18	M	UL	X	UL	PW	UL	UL	UL	UL	PW	UL	15	0	15	0	19	15	16	14	0	21
226	18	M	PW	PW	UL	TL	UL	PW	PW	UL	PW	UL	0	0	14	0	14	0	0	15	0	12
227	18	M	UL	UL	UL	UL	UL	UL	UL	UL	RL	UL	16	19	18	14	14	15	19	16	6	13

MALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
228	19	M	UL	PW	PW	UL	UL	UL	UL	UL	UL	UL	14	0	0	12	15	15	14	12	15	15
229	17	M	UL	TL	UL	SA	X	UL	PW	UL	RL	UL	13	22	14	0	0	14	0	14	14	17
230	20	M	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	0	0	0	0	0	0	0	0	0	0
231	19	M	UL	UL	UL	UL	TL	PW	PW	UL	SA	UL	16	16	7	8	0	0	0	14	0	21
232	45	M	UL	UL	UL	SA	CPL	UL	UL	UL	UL	SA	14	16	12	0	7	11	16	13	7	0
233	18	M	UL	PW	UL	UL	PW	UL	PW	UL	UL	TL	16	0	17	17	0	14	0	15	13	0
234	18	M	PW	PW	CPL	TL	UL	PW	PW	PW	PW	UL	0	0	0	0	22	0	0	0	0	19
235	18	M	UL	UL	UL	UL	UL	UL	PW	UL	TL	UL	15	15	13	17	21	12	0	15	0	23
236	19	M	PW	PW	TL	TL	TL	PW	PW	PW	TL	TL	0	0	0	0	0	0	0	0	0	0
237	18	M	UL	PW	TL	TL	TL	PW	PW	PW	PW	PW	14	0	0	0	0	0	0	0	0	0
238	19	M	UL	UL	SA	UL	UL	UL	UL	SA	SA	UL	15	8	0	4	6	13	13	0	0	9
239	18	M	PW	PW	UL	RL	SA	PW	PW	UL	PW	UL	0	0	11	15	0	0	0	8	0	19
240	19	M	UL	TL	SA	TL	UL	UL	PW	X	PW	PW	17	0	0	0	11	15	0	0	0	0
241	19	M	UL	PW	PW	PW	UL	UL	PW	UL	PW	TL	19	0	0	0	17	16	0	16	0	0
242	19	M	UL	PW	UL	PW	TL	UL	CPL	UL	PW	TL	13	0	16	0	0	14	0	14	0	0
243	19	M	TL	PW	UL	PW	UL	UL	PW	UL	PW	PW	18	0	15	0	20	14	0	12	0	0
244	18	M	UL	PW	UL	PW	UL	UL	PW	PW	RL	UL	16	0	18	0	18	18	0	0	19	19
245	22	M	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
246	44	M	AT	UL	UL	X	TL	UL	UL	X	UL	UL	14	18	12	13	0	9	21	0	21	20
247	39	M	PW	PW	UL	UL	UL	PW	PW	UL	UL	UL	0	0	15	13	17	0	0	17	17	18
248	20	M	UL	UL	PW	PW	PW	UL	PW	UL	PW	CPL	17	16	0	0	0	15	0	13	0	0
249	21	M	PW	PW	UL	UL	SA	UL	PW	UL	UL	UL	0	0	14	15	0	13	0	15	17	15
250	21	M	PW	PW	PW	RL	UL	PW	PW	UL	RL	UL	0	0	0	14	16	0	0	11	14	16

MASTER CHART – FEMALES

FEMALES																					
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
1	18	F	UL	UL	UL	UL	PW	UL	UL	AT	UL	PW	17	24	17	15	0	10	21	18	12	0
2	18	F	UL	EA	AT	AT	PW	EA	EA	EA	EA	PW	13	0	0	0	0	0	0	0	0	0
3	18	F	UL	CPL	AT	AT	PW	UL	UL	UL	EA	PW	11	0	0	0	0	10	13	13	0	0
4	18	F	UL	PW	TL	PW	TL	TL	PW	PW	PW	TL	13	0	0	0	0	0	0	0	0	0
5	19	F	UL	EA	UL	UL	UL	UL	PW	UL	SA	UL	19	0	20	16	21	16	0	21	21	21
6	19	F	PW	PW	PW	PW	PW	CPL	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
7	18	F	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
8	18	F	UL	EA	AT	AT	UL	UL	UL	EA	UL	UL	10	0	0	0	18	9	11	0	13	20
9	19	F	UL	PW	PW	UL	PW	PW	PW	UL	PW	PW	17	0	0	10	0	0	0	11	0	0
10	17	F	UL	CPL	UL	PW	TL	UL	PW	UL	PW	PW	14	0	14	0	0	15	0	12	0	0
11	18	F	UL	CPL	UL	UL	SA	UL	UL	UL	EA	UL	14	0	15	14	17	16	18	13	0	16
12	18	F	CPL	UL	UL	TL	UL	UL	TL	UL	TL	PW	14	18	20	0	23	14	0	20	0	0
13	18	F	UL	UL	UL	AT	TL	UL	UL	UL	RL	UL	18	14	12	0	0	13	13	16	11	17
14	18	F	UL	PW	UL	PW	TL	UL	PW	UL	PW	X	14	0	14	0	0	12	0	12	0	0
15	18	F	UL	UL	PW	UL	TL	UL	PW	TL	TL	TL	19	21	0	16	0	18	0	0	0	0
16	14	F	PW	PW	PW	PW	UL	PW	PW	PW	PW	UL	0	0	0	0	15	0	0	0	0	22
17	14	F	UL	PW	UL	UL	PW	UL	UL	UL	UL	TL	14	0	19	14	0	9	20	15	13	0
18	14	F	UL	PW	UL	UL	UL	UL	CPL	UL	SA	SA	7	0	9	7	8	10	0	8	0	0
19	15	F	AT	AT	AT	AT	AT	AT	AT	AT	AT	AT	0	0	0	0	0	0	0	0	0	0
20	13	F	CPL	PW	UL	AT	SA	UL	UL	UL	UL	SA	0	0	15	0	0	14	19	14	14	0
21	14	F	PW	PW	TL	PW	UL	CPL	PW	PW	PW	TL	0	0	18	0	24	0	0	0	0	0

FEMALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
22	14	F	PW	PW	PW	PW	CPL	PW	PW	PW	PW	CPL	0	0	0	0	0	0	0	0	0	0
23	16	F	UL	UL	UL	RL	UL	UL	UL	UL	UL	PW	0	12	9	11	11	7	10	10	12	11
24	15	F	PW	PW	UL	UL	TL	PW	UL	UL	UL	UL	0	0	19	17	0	0	17	15	17	23
25	16	F	UL	PW	UL	SA	UL	UL	UL	UL	UL	UL	10	0	9	0	10	9	15	7	12	14
26	16	F	UL	PW	TL	PW	PW	UL	PW	UL	TL	PW	19	0	0	0	0	20	0	15	0	0
27	16	F	UL	PW	UL	PW	UL	PW	PW	UL	UL	UL	19	0	14	0	16	0	0	13	15	17
28	16	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	9	9	13	9	18	8	12	12	12	18
29	15	F	X	PW	UL	PW	UL	PW	PW	UL	PW	TL	0	0	21	0	19	0	0	19	0	0
30	18	F	UL	UL	UL	RL	UL	UL	UL	UL	UL	UL	16	15	13	9	18	13	13	13	15	16
31	18	F	UL	PW	UL	PW	TL	UL	PW	UL	UL	PW	16	0	18	0	0	13	0	17	19	0
32	18	F	UL	UL	UL	PW	UL	UL	PW	UL	UL	PW	14	19	16	0	15	12	0	18	15	0
33	18	F	UL	PW	PW	UL	UL	UL	UL	UL	UL	UL	18	0	0	19	19	18	20	20	13	19
34	20	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	12	12	8	6	7	8	8	6	6	0
35	20	F	UL	PW	PW	PW	UL	UL	TL	TL	TL	UL	16	0	0	0	23	16	0	0	0	18
36	18	F	UL	PW	UL	UL	PW	UL	UL	UL	PW	UL	14	0	11	12	0	13	15	12	0	12
37	19	F	UL	UL	UL	UL	UL	UL	UL	RL	UL	UL	13	12	8	8	7	16	18	4	8	17
38	18	F	UL	PW	UL	UL	TL	UL	PW	UL	UL	TL	11	0	10	9	0	5	0	11	5	0
39	18	F	UL	UL	UL	UL	PW	UL	UL	UL	UL	UL	18	10	10	8	0	20	16	11	10	15
40	19	F	PW	PW	PW	PW	TL	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
41	18	F	PW	PW	PW	PW	TL	UL	PW	UL	PW	TL	0	0	0	0	0	18	0	14	0	0
42	19	F	UL	PW	UL	EA	TL	UL	PW	UL	TL	TL	20	0	14	0	0	16	0	19	0	0
43	20	F	EA	UL	EA	UL	UL	UL	UL	UL	AT	UL	0	15	0	16	21	8	16	13	0	21
44	18	F	UL	UL	UL	UL	PW	UL	UL	UL	UL	UL	9	13	11	14	0	12	14	14	12	18

FEMALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
45	18	F	PW	PW	PW	UL	PW	PW	PW	UL	TL	UL	0	0	0	15	0	0	0	14	16	18
46	18	F	UL	CPL	UL	UL	UL	UL	UL	UL	UL	UL	18	18	14	13	16	18	15	18	16	21
47	19	F	PW	PW	PW	PW	TL	PW	PW	UL	PW	TL	0	0	0	0	0	0	0	19	0	0
48	28	F	UL	UL	UL	AT	UL	UL	UL	UL	UL	EA	19	21	10	0	12	12	21	18	14	0
49	20	F	PW	PW	PW	RL	PW	UL	UL	UL	TL	TL	0	0	0	16	0	16	16	13	0	0
50	20	F	UL	UL	PW	PW	UL	UL	PW	UL	PW	TL	11	14	0	0	14	11	0	10	0	0
51	19	F	UL	UL	CPL	PW	UL	UL	CPL	UL	PW	UL	19	13	0	0	12	10	0	13	0	15
52	19	F	UL	UL	EA	UL	X	UL	UL	UL	UL	PW	16	16	0	15	0	12	13	15	15	0
53	19	F	UL	UL	X	X	TL	UL	UL	UL	EA	TL	17	20	0	0	0	17	20	16	0	0
54	37	F	PW	PW	PW	PW	UL	EA	PW	UL	TL	UL	0	0	0	0	17	0	0	17	0	19
55	16	F	UL	UL	UL	UL	PW	UL	UL	UL	UL	UL	13	12	11	12	0	12	14	14	14	17
56	36	F	TL	UL	AT	UL	UL	UL	UL	UL	UL	PW	16	13	0	16	18	13	10	12	13	0
57	25	F	UL	AT	UL	UL	TL	UL	PW	UL	UL	PW	13	13	14	12	0	13	0	14	11	0
58	32	F	UL	CPL	PW	RL	TL	UL	PW	TL	TL	UL	19	0	0	20	0	17	0	0	0	18
59	18	F	UL	CPL	UL	UL	SA	UL	PW	UL	PW	UL	16	0	17	13	0	18	0	16	0	12
60	19	F	UL	PW	UL	UL	TL	UL	PW	UL	TL	UL	16	0	18	18	0	23	0	21	0	25
61	17	F	UL	PW	PW	PW	UL	UL	PW	PW	PW	PW	16	0	0	0	14	16	0	0	0	0
62	18	F	UL	UL	UL	PW	PW	UL	UL	UL	PW	PW	16	18	16	0	0	12	14	16	0	0
63	18	F	UL	PW	PW	PW	TL	UL	PW	PW	PW	PW	14	0	0	0	0	20	0	0	0	0
64	17	F	UL	PW	UL	UL	TL	UL	PW	UL	UL	TL	19	0	16	16	0	19	0	17	16	0
65	21	F	UL	PW	UL	UL	PW	UL	PW	UL	UL	UL	16	0	20	0	0	0	0	0	0	0
66	20	F	UL	UL	UL	PW	UL	UL	UL	UL	TL	UL	10	14	12	0	17	16	11	12	0	17
67	18	F	UL	PW	PW	PW	UL	UL	PW	UL	UL	UL	13	0	0	0	17	14	0	13	14	17

FEMALES																					
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
68	18	F	UL	PW	PW	UL	TL	UL	PW	UL	UL	TL	23	0	0	15	0	18	0	22	17	0
69	18	F	UL	UL	AT	AT	TL	UL	UL	UL	UL	PW	18	15	0	0	0	18	16	15	16	0
70	15	F	UL	PW	UL	PW	PW	UL	PW	UL	UL	TL	22	0	20	0	0	18	0	19	17	0
71	15	F	UL	UL	UL	PW	TL	CPL	UL	UL	UL	UL	18	20	16	0	0	0	18	21	21	26
72	16	F	UL	UL	PW	UL	PW	UL	PW	TL	UL	UL	14	14	0	14	0	14	0	0	14	23
73	14	F	PW	PW	PW	RL	PW	UL	PW	UL	EA	PW	0	0	0	13	0	14	0	15	16	0
74	16	F	AT	UL	AT	AT	UL	SA	CPL	UL	SA	UL	0	10	0	0	9	0	0	6	0	11
75	18	F	AT	AT	AT	AT	UL	UL	AT	AT	AT	UL	0	0	0	0	15	9	0	0	0	19
76	19	F	UL	PW	UL	PW	UL	UL	UL	UL	UL	UL	10	0	15	0	27	9	16	10	18	20
77	19	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	18	20	15	13	19	18	18	14	16	16
78	19	F	UL	UL	UL	CPL	UL	UL	UL	SA	CPL	UL	12	15	7	0	8	15	16	11	0	20
79	20	F	PW	PW	SA	SA	UL	AT	PW	AT	UL	UL	0	0	0	0	10	10	0	0	8	8
80	20	F	UL	PW	PW	PW	TL	PW	PW	PW	AT	PW	17	0	0	0	0	0	0	0	0	0
81	19	F	PW	PW	PW	PW	UL	PW	PW	UL	UL	UL	0	0	0	0	17	0	0	15	17	17
82	20	F	UL	UL	UL	AT	UL	UL	UL	UL	AT	UL	17	15	15	0	15	10	15	13	0	9
83	18	F	UL	UL	UL	UL	UL	UL	CPL	UL	UL	PW	15	15	15	14	16	14	0	15	7	0
84	17	F	UL	CPL	UL	RL	UL	UL	UL	UL	UL	UL	17	0	11	11	19	14	21	13	14	18
85	19	F	UL	UL	TL	TL	SA	UL	PW	UL	PW	UL	14	17	0	0	0	12	0	13	0	16
86	18	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	21	14	9	11	12	13	11	12	17	13
87	19	F	AT	PW	UL	UL	PW	UL	PW	UL	UL	UL	0	0	13	16	0	15	0	15	15	22
88	19	F	UL	CPL	UL	UL	AT	UL	PW	UL	CPL	UL	22	0	18	14	0	19	0	17	0	12
89	19	F	UL	UL	UL	AT	UL	UL	UL	UL	UL	UL	9	9	6	0	8	10	18	8	6	9
90	19	F	UL	PW	UL	UL	TL	PW	PW	UL	UL	TL	16	0	16	13	0	0	0	18	17	0

FEMALES																					
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
91	19	F	UL	PW	TL	TL	TL	UL	UL	TL	TL	TL	24	0	0	0	0	21	30	0	0	0
92	18	F	UL	UL	UL	PW	TL	UL	UL	UL	UL	PW	15	17	15	0	0	16	18	15	15	0
93	18	F	UL	UL	UL	SA	UL	PW	UL	SA	PW	UL	16	16	12	0	13	0	15	0	0	0
94	18	F	CPL	UL	UL	UL	UL	UL	CPL	UL	UL	TL	0	16	15	12	21	14	0	14	11	0
95	18	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	10	11	15	14	11	10	14	15	11	14
96	18	F	PW	RL	UL	PW	PW	PW	UL	UL	UL	UL	0	14	11	0	0	0	11	16	15	21
97	21	F	UL	UL	UL	UL	UL	UL	UL	UL	CPL	UL	15	15	13	10	15	11	15	10	0	16
98	21	F	UL	UL	UL	PW	UL	UL	PW	UL	UL	UL	19	18	18	0	20	18	0	18	19	19
99	19	F	UL	PW	PW	UL	UL	UL	PW	UL	X	UL	19	0	0	19	19	16	0	18	0	21
100	16	F	PW	PW	UL	UL	UL	UL	PW	UL	UL	UL	0	0	16	12	13	9	0	14	12	12
101	16	F	PW	PW	PW	RL	PW	UL	CPL	UL	UL	UL	0	0	0	17	0	13	0	16	16	17
102	22	F	UL	PW	PW	PW	TL	UL	PW	PW	PW	TL	19	0	0	0	0	19	0	0	0	0
103	19	F	UL	UL	UL	PW	PW	UL	UL	UL	UL	PW	23	21	19	0	0	22	22	17	20	0
104	21	F	UL	PW	UL	PW	PW	PW	PW	UL	PW	PW	17	0	17	0	0	0	0	15	0	0
105	18	F	UL	PW	UL	UL	TL	UL	UL	UL	SA	TL	8	0	7	10	0	8	18	12	0	0
106	17	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	PW	12	15	14	12	17	11	17	15	15	0
107	19	F	UL	PW	UL	UL	PW	PW	PW	UL	UL	TL	18	0	16	16	0	0	0	18	16	0
108	20	F	AT	UL	UL	UL	PW	PW	PW	UL	UL	UL	0	17	13	15	0	0	0	13	15	14
109	20	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	10	11	8	10	13	10	12	9	11	14
110	18	F	UL	PW	UL	SA	UL	UL	UL	UL	UL	UL	16	0	11	0	13	19	25	12	13	23
111	18	F	UL	UL	UL	AT	SA	UL	UL	UL	UL	UL	15	13	11	0	0	17	16	15	13	14
112	18	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	10	16	4	15	18	12	17	15	16	17
113	18	F	UL	PW	UL	UL	TL	UL	UL	EA	UL	UL	11	0	14	10	0	11	11	0	12	15

FEMALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
114	13	F	PW	UL	UL	SA	SA	PW	CPL	UL	UL	UL	0	14	15	0	0	0	0	16	13	14
115	20	F	CPL	CPL	UL	PW	PW	UL	PW	UL	PW	PW	0	0	18	0	0	18	0	19	0	0
116	18	F	PW	PW	PW	PW	UL	PW	PW	PW	PW	UL	0	0	0	0	24	0	0	0	0	21
117	18	F	EA	UL	SA	RL	UL	UL	UL	UL	UL	UL	15	17	0	10	14	13	15	9	10	17
118	18	F	UL	UL	UL	UL	TL	UL	UL	UL	UL	RL	16	19	15	15	0	17	15	16	15	24
119	18	F	UL	PW	UL	PW	UL	UL	PW	UL	UL	UL	10	0	10	0	10	10	0	12	10	7
120	18	F	CPL	UL	SA	SA	PW	UL	UL	UL	UL	UL	0	18	0	0	0	21	19	13	16	26
121	26	F	PW	PW	PW	TL	TL	PW	PW	PW	SA	PW	0	0	0	0	0	0	0	0	0	0
122	27	F	UL	UL	UL	PW	UL	UL	PW	UL	RL	TL	11	14	14	0	14	11	0	13	11	0
123	14	F	UL	UL	SA	UL	UL	UL	PW	PW	PW	UL	15	20	15	11	13	17	0	0	0	11
124	13	F	CPL	CPL	AT	AT	PW	UL	PW	AT	SA	UL	0	0	0	0	0	10	0	0	0	16
125	13	F	PW	PW	UL	UL	UL	PW	PW	UL	PW	UL	0	0	14	14	17	0	0	12	0	15
126	14	F	UL	UL	UL	CPL	TL	UL	CPL	UL	PW	UL	7	20	16	0	0	12	0	16	0	22
127	14	F	CPL	RL	PW	PW	PW	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
128	13	F	UL	PW	PW	UL	UL	UL	UL	UL	PW	UL	12	0	0	14	21	14	20	14	0	21
129	14	F	UL	PW	UL	PW	UL	UL	UL	UL	CPL	UL	8	0	14	0	12	7	14	11	0	14
130	17	F	CPL	PW	UL	PW	UL	UL	CPL	UL	UL	UL	0	0	17	0	20	15	0	17	14	19
131	20	F	UL	PW	UL	PW	PW	UL	UL	UL	UL	TL	16	0	16	0	0	14	18	13	17	0
132	20	F	UL	CPL	UL	UL	PW	PW	PW	UL	UL	PW	15	0	17	17	0	0	0	18	18	0
133	20	F	PW	PW	PW	PW	PW	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
134	18	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	18	17	17	15	18	18	19	16	15	16
135	19	F	EA	EA	EA	SA	EA	EA	UL	UL	EA	UL	0	0	0	0	0	0	10	13	0	15
136	17	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	20	18	18	14	18	15	17	18	17	20

FEMALES																					
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
137	18	F	CPL	PW	PW	PW	PW	UL	PW	PW	PW	PW	0	0	0	0	0	13	0	0	0	0
138	19	F	UL	EA	SA	RL	TL	EA	UL	EA	EA	UL	14	0	0	16	0	0	18	0	0	15
139	19	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	10	13	10	11	11	10	13	12	13	13
140	17	F	UL	PW	EA	AT	UL	UL	UL	UL	EA	UL	12	0	0	0	15	15	14	12	0	13
141	19	F	UL	UL	UL	CPL	UL	UL	PW	UL	UL	TL	19	19	17	0	18	18	0	15	14	0
142	19	F	UL	PW	UL	PW	PW	UL	PW	PW	PW	PW	15	0	18	0	0	17	0	0	0	0
143	19	F	UL	PW	UL	EA	UL	EA	UL	UL	UL	UL	11	0	10	0	13	0	14	11	9	12
144	20	F	UL	PW	UL	PW	PW	UL	UL	UL	UL	PW	11	0	13	0	0	14	14	13	13	0
145	21	F	UL	UL	UL	UL	UL	UL	PW	UL	UL	UL	14	17	14	11	13	12	0	14	11	15
146	17	F	UL	PW	CPL	PW	UL	CPL	PW	PW	PW	UL	19	0	0	0	29	0	0	0	0	26
147	18	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	17	17	14	12	19	19	21	12	13	16
148	18	F	UL	CPL	UL	UL	UL	UL	AT	UL	EA	UL	12	0	14	13	12	12	14	15	0	12
149	18	F	UL	UL	UL	AT	UL	UL	UL	UL	UL	UL	16	14	18	0	18	15	18	17	20	20
150	19	F	PW	PW	TL	X	PW	PW	PW	TL	UL	UL	0	0	0	14	17	0	0	0	15	18
151	15	F	UL	UL	AT	AT	PW	UL	UL	UL	UL	TL	7	14	0	0	0	13	11	10	9	0
152	18	F	UL	PW	TL	X	TL	UL	PW	UL	UL	UL	20	0	0	0	0	17	0	20	22	17
153	18	F	PW	PW	UL	PW	PW	UL	PW	UL	UL	PW	0	0	19	0	0	19	0	19	20	0
154	18	F	UL	UL	UL	RL	UL	UL	UL	UL	RL	UL	16	14	14	14	20	13	14	15	13	20
155	18	F	AT	AT	AT	EA	UL	EA	AT	AT	EA	UL	0	0	0	0	19	0	0	0	0	14
156	18	F	UL	PW	PW	PW	UL	PW	PW	UL	PW	PW	17	0	0	0	23	0	0	17	0	0
157	18	F	UL	UL	UL	TL	UL	UL	CPL	UL	EA	SA	14	13	13	11	12	14	15	15	0	0
158	18	F	UL	PW	PW	PW	PW	UL	PW	PW	PW	PW	18	0	0	0	0	21	0	0	0	0
159	18	F	PW	PW	PW	PW	TL	UL	PW	PW	PW	UL	0	0	0	0	0	20	0	0	0	20

FEMALES																					
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
160	18	F	UL	PW	PW	PW	PW	UL	PW	PW	PW	PW	18	0	0	0	0	22	0	0	0	0
161	19	F	UL	PW	PW	SA	PW	UL	UL	UL	UL	UL	19	0	0	0	0	17	19	17	18	21
162	19	F	UL	PW	AT	AT	UL	AT	AT	AT	PW	UL	14	0	0	0	18	0	0	0	0	21
163	18	F	UL	CPL	SA	UL	CPL	PW	UL	UL	UL	SA	11	0	0	10	0	0	10	10	8	0
164	19	F	UL	CPL	SA	UL	TL	PW	RL	SA	UL	PW	9	0	0	9	0	0	8	0	9	0
165	19	F	UL	UL	AT	UL	UL	UL	UL	AT	UL	UL	10	7	0	12	21	10	15	0	18	19
166	19	F	UL	PW	PW	CPL	UL	UL	UL	UL	PW	UL	17	0	0	0	15	19	22	13	0	19
167	18	F	UL	PW	UL	PW	PW	UL	PW	UL	UL	TL	16	0	18	0	0	18	0	18	14	0
168	17	F	UL	CPL	UL	RL	UL	UL	UL	UL	UL	UL	18	0	18	0	0	18	0	18	14	0
169	18	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	16	19	17	16	18	17	20	19	15	20
170	17	F	UL	CPL	CPL	RL	PW	UL	CPL	UL	CPL	UL	15	0	0	12	0	17	0	14	0	18
171	18	F	TL	TL	PW	PW	TL	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
172	18	F	UL	UL	PW	PW	PW	UL	PW	PW	PW	TL	15	18	0	0	0	17	0	0	0	0
173	18	F	PW	RL	UL	UL	TL	UL	PW	UL	UL	UL	0	15	15	15	0	11	0	17	15	15
174	18	F	UL	UL	UL	UL	UL	UL	UL	UL	PW	UL	13	17	17	16	17	13	16	17	0	18
175	18	F	RL	PW	AT	UL	UL	UL	UL	UL	UL	TL	14	0	0	9	6	14	18	16	13	0
176	18	F	UL	UL	AT	AT	UL	UL	UL	AT	RL	UL	13	14	0	0	9	10	10	0	0	10
177	19	F	UL	PW	UL	UL	UL	UL	PW	UL	UL	UL	11	0	12	12	16	12	0	16	14	17
178	20	F	UL	UL	UL	CPL	PW	UL	UL	UL	UL	PW	16	18	18	0	0	17	17	11	15	0
179	20	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	13	11	13	13	10	9	13	11	7	9
180	18	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	15	13	13	13	14	13	14	14	15	18
181	16	F	UL	UL	UL	PW	TL	UL	UL	TL	PW	UL	12	12	11	0	0	10	15	12	0	12
182	38	F	PW	PW	PW	PW	PW	UL	PW	UL	UL	TL	0	0	0	0	0	17	0	16	16	0

FEMALES																					
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
183	60	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	10	13	15	15	17	9	11	13	16	17
184	36	F	PW	PW	PW	PW	TL	PW	PW	UL	UL	UL	0	0	0	0	0	0	0	19	22	18
185	40	F	UL	UL	UL	RL	PW	CPL	UL	UL	RL	PW	15	22	17	14	0	14	22	23	18	0
186	40	F	UL	UL	UL	PW	TL	PW	UL	UL	PW	TL	15	19	14	0	0	0	20	14	0	0
187	36	F	UL	PW	UL	UL	SA	UL	UL	UL	SA	SA	13	0	9	8	0	15	13	6	0	0
188	20	F	UL	PW	TL	PW	UL	PW	PW	UL	UL	UL	14	0	0	0	20	0	0	13	10	18
189	19	F	UL	UL	UL	UL	TL	UL	UL	UL	PW	UL	15	22	17	8	0	11	17	16	0	17
190	19	F	PW	PW	PW	TL	TL	PW	PW	UL	TL	TL	0	0	0	0	0	0	0	12	0	0
191	20	F	UL	PW	UL	UL	SA	UL	PW	UL	UL	UL	18	0	15	11	0	23	0	19	12	15
192	18	F	UL	CPL	UL	SA	PW	UL	UL	UL	RL	PW	17	0	13	0	0	14	14	12	0	0
193	18	F	UL	UL	PW	UL	TL	UL	UL	UL	UL	PW	16	19	0	16	0	17	17	16	16	0
194	18	F	UL	PW	PW	TL	UL	UL	CPL	UL	PW	PW	13	0	0	0	16	13	0	15	0	0
195	18	F	UL	EA	UL	UL	TL	UL	UL	UL	UL	UL	14	0	12	15	14	14	12	12	14	14
196	18	F	UL	UL	UL	PW	PW	UL	PW	UL	PW	PW	17	17	18	0	0	15	0	15	0	0
197	18	F	PW	PW	PW	RL	PW	PW	PW	TL	PW	UL	0	0	0	20	0	0	0	0	0	20
198	17	F	UL	UL	UL	SA	UL	UL	UL	UL	SA	UL	14	20	22	0	22	17	21	17	0	21
199	18	F	UL	UL	UL	AT	UL	UL	UL	UL	UL	PW	12	18	13	0	20	15	20	16	11	0
200	18	F	UL	EA	EA	AT	UL	UL	EA	EA	AT	UL	14	0	0	0	16	10	0	0	0	21
201	18	F	UL	PW	UL	CPL	UL	UL	UL	UL	UL	UL	8	0	14	0	25	9	17	10	18	20
202	18	F	UL	UL	AT	SA	UL	UL	UL	UL	UL	UL	8	11	0	0	7	8	16	8	3	8
203	18	F	PW	PW	UL	UL	TL	PW	PW	UL	UL	PW	0	0	14	10	0	0	0	17	16	0
204	18	F	PW	PW	EA	PW	UL	PW	PW	UL	PW	TL	0	0	0	0	20	0	0	14	0	0
205	18	F	PW	PW	UL	UL	PW	UL	PW	UL	UL	UL	0	0	12	12	0	13	0	13	12	23

FEMALES																						
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
206	18	F	UL	UL	UL	PW	TL	UL	UL	UL	PW	TL	19	18	14	0	0	12	16	14	0	0
207	18	F	UL	PW	PW	PW	PW	UL	PW	PW	PW	PW	17	0	0	0	0	17	0	0	0	0
208	18	F	AT	PW	UL	RL	PW	AT	UL	UL	UL	PW	0	0	16	17	0	0	15	11	12	0
209	19	F	UL	UL	UL	RL	UL	UL	UL	UL	AT	UL	16	16	12	10	23	13	18	10	0	23
210	19	F	PW	PW	PW	PW	TL	PW	PW	UL	PW	PW	0	0	0	0	0	0	0	19	0	0
211	19	F	EA	EA	AT	AT	UL	UL	AT	SA	AT	UL	0	0	0	0	14	16	0	0	0	19
212	19	F	PW	PW	PW	X	PW	PW	PW	UL	UL	PW	0	0	0	0	0	0	0	15	19	0
213	20	F	UL	PW	UL	SA	TL	PW	PW	UL	PW	PW	17	0	17	0	0	0	0	16	0	0
214	19	F	TL	PW	PW	PW	PW	PW	PW	PW	PW	PW	0	0	0	0	0	0	0	0	0	0
215	18	F	UL	PW	UL	PW	TL	EA	UL	UL	PW	UL	8	0	19	0	0	6	19	17	0	16
216	18	F	PW	PW	PW	CPL	UL	PW	PW	UL	CPL	CPL	0	0	0	0	12	0	0	18	0	0
217	20	F	UL	PW	SA	SA	UL	UL	UL	SA	SA	UL	4	0	0	0	22	6	15	0	0	18
218	21	F	UL	UL	UL	UL	TL	UL	PW	UL	UL	PW	11	17	15	14	0	7	0	13	18	0
219	19	F	UL	UL	AT	PW	RL	UL	UL	SA	PW	RL	12	12	0	0	16	13	14	0	0	13
220	19	F	PW	PW	UL	UL	UL	PW	RL	UL	PW	UL	0	0	14	11	12	0	14	15	0	23
221	18	F	UL	UL	UL	UL	UL	UL	UL	UL	PW	TL	11	14	12	12	17	12	12	12	0	17
222	19	F	UL	UL	UL	UL	UL	UL	UL	UL	UL	UL	9	6	16	13	14	11	13	15	13	16
223	19	F	UL	CPL	AT	UL	UL	UL	UL	UL	UL	UL	16	0	16	10	16	13	18	13	11	26
224	19	F	UL	UL	EA	UL	UL	UL	UL	EA	EA	UL	11	12	0	7	14	10	14	0	0	17
225	19	F	EA	SA	EA	SA	UL	EA	EA	EA	SA	UL	0	0	0	0	8	0	0	0	0	14
226	20	F	UL	PW	TL	PW	UL	UL	PW	UL	PW	UL	13	0	0	0	20	15	0	18	0	25
227	19	F	UL	UL	AT	AT	UL	UL	UL	UL	UL	UL	11	15	0	0	12	11	17	11	8	12
228	19	F	UL	UL	UL	SA	UL	UL	UL	UL	SA	UL	7	18	5	0	8	8	19	8	0	14

FEMALES																					
SL NO	AGE	SEX	FINGER PRINT PATTERN										RIDGE COUNT									
			LEFT HAND					RIGHT HAND					LEFT HAND					RIGHT HAND				
			LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB	LITTLE	RING	MIDDLE	INDEX	THUMB
229	19	F	PW	PW	PW	RL	TL	UL	PW	TL	TL	EA	0	0	0	15	0	18	0	0	0	0
230	19	F	UL	PW	EA	EA	TL	UL	PW	UL	EA	PW	16	0	0	0	0	17	0	17	0	0
231	20	F	UL	PW	PW	PW	UL	UL	UL	UL	UL	UL	16	0	0	0	14	16	16	18	18	17
232	19	F	UL	UL	UL	PW	UL	UL	PW	UL	SA	UL	10	15	13	0	13	13	0	8	0	14
233	21	F	UL	PW	PW	X	PW	UL	PW	UL	UL	PW	15	0	0	0	0	18	0	13	13	0
234	20	F	UL	PW	CPL	PW	PW	UL	PW	UL	UL	TL	17	0	17	0	0	17	0	18	18	0
235	19	F	PW	PW	TL	PW	TL	EA	PW	UL	UL	SA	0	0	0	0	0	0	0	8	9	0
236	18	F	UL	UL	EA	EA	UL	CPL	CPL	UL	UL	UL	14	14	0	0	16	0	0	10	13	20
237	20	F	UL	PW	UL	SA	TL	UL	UL	UL	UL	SA	13	0	11	0	0	12	17	13	13	14
238	18	F	EA	AT	AT	SA	TL	EA	UL	UL	SA	UL	0	0	0	0	0	0	20	11	0	18
239	15	F	UL	UL	UL	UL	PW	UL	UL	UL	UL	TL	12	16	13	11	0	13	16	16	13	0
240	32	F	PW	PW	TL	SA	UL	PW	PW	UL	CPL	UL	0	0	0	0	12	0	0	10	0	15
241	32	F	UL	UL	UL	RL	SA	UL	UL	UL	UL	UL	12	12	12	13	0	14	8	17	14	13
242	30	F	PW	PW	UL	UL	UL	PW	PW	UL	UL	UL	0	0	14	11	17	0	0	17	17	21
243	30	F	PW	PW	PW	PW	PW	CPL	PW	CPL	PW	PW	0	0	0	0	0	0	0	0	0	0
244	19	F	UL	CPL	UL	UL	TL	UL	UL	UL	UL	UL	15	0	14	9	0	14	15	11	11	21
245	20	F	PW	PW	PW	RL	PW	PW	PW	PW	UL	UL	0	0	0	19	0	0	0	0	14	15
246	18	F	CPL	PW	UL	AT	TL	UL	EA	UL	UL	TL	0	0	11	0	0	21	0	17	8	0
247	21	F	PW	PW	TL	UL	TL	PW	PW	UL	UL	UL	0	0	0	16	0	0	0	18	16	16
248	18	F	SA	UL	UL	RL	UL	UL	UL	UL	PW	UL	0	12	11	11	8	11	11	9	0	7
249	18	F	UL	UL	UL	EA	UL	UL	PW	UL	PW	UL	16	18	17	0	15	17	0	15	0	17
250	18	F	CPL	AT	AT	UL	UL	UL	CPL	UL	UL	PW	0	0	0	14	20	16	0	14	15	0